B
C 34

62035/B

B
c. 34

The Library of the
Wellcome Institute for
the History of Medicine

MEDICAL SOCIETY
OF LONDON

Accession Number

Press Mark
ALLAN, R.

Vol 1 only

A

SYSTEM

OF

PATHOLOGICAL & OPERATIVE SURGERY,

FOUNDED ON

ANATOMY.

VOL. I.

SOCIETY OF LONDON
Established
1773
11, CHANDOS ST.

A
SYSTEM
OF
PATHOLOGICAL & OPERATIVE SURGERY,

FOUNDED ON

ANATOMY:

ILLUSTRATED BY
DRAWINGS OF DISEASED STRUCTURE,
AND
PLANS OF OPERATION.

BY
ROBERT ALLAN,
FELLOW OF THE ROYAL COLLEGES OF SURGEONS OF LONDON AND EDINBURGH,
SURGEON TO THE ROYAL PUBLIC DISPENSARY FOR THE CITY AND
COUNTY OF EDINBURGH, AND LECTURER ON SURGERY.

IN THREE VOLUMES.

VOL. I.

EDINBURGH:
Printed at the University Press,
FOR JOHN THOMSON AND COMPANY, EDINBURGH,
BALDWIN, CRADOCK & JOY, LONDON,
AND JOHN CUMMING, DUBLIN.

1819.

B3

The Author presents this Volume to the Senior part of his profession with diffidence and respect.—To the Junior part, not without hopes of its being useful.—And to his Pupils, as a mark of gratitude for the kindness and partiality they have on all occasions shewn to him as a Public Teacher.

PREFACE.

As there is no elementary book in the English language which embraces Medical, as well as Operative Surgery, except the "First Lines" of Mr Samuel Cooper, the Author has composed the present Work for the benefit of the Junior part of his profession, and particularly for those in whom he has a nearer interest as a Teacher. The work now mentioned, though a useful manual, is not sufficiently extensive for the purposes of a system, being in an abridged form, and exhibiting a mere epitome of the science: hence, it is more adapted to the student than the practitioner. To supply this defect, and to present a connected view of Medical, as well as Operative Surgery, founded on Anatomy, and so comprehensive as to embrace the whole pathology of the science, the Author has undertaken the present Work. He is fully aware of the difficulties of the undertaking, but hopes he does not come forward wholly unprepared for the task.

It has been the good fortune of the Author to be trained to Surgery in an Anatomical Theatre, and under one who ranks high in his profession. He has been engaged in practice upwards of twenty years, the first eight of which were passed in the public service; the next eight years he was associated as a partner with his early preceptor, Mr J. Bell, during which time he assisted in all his operations; and for the last six years he has officiated as a public teacher of Surgery.

It is only of late years that the value of Surgical Anatomy has been justly appreciated, and the intimate connection which subsists betwixt Anatomy and Surgery fully pointed out. The views of the student were in a special manner directed to this intimate relation of the two sciences by Mr

J. Bell, since which time Surgical Anatomy has been more diligently taught in the schools of London, Dublin, and Edinburgh, and has contributed greatly to the advancement of Surgery. In this work, the Author has founded all his reasonings on the structure and functions of the parts. In the arrangement of this first volume, he has given first a short and general introductory view of the doctrines of Inflammation. He has then treated of the variety of forms under which Inflammation presents itself,—after which he has discoursed on Ulcers as sequences of the various Inflammations,—then of Wounds, where the terminations and consequences of Inflammation fall again to be considered,---lastly, he has added a Chapter on those Bandages which disease, accident, or operation may require; and to render the whole more extensively useful, he has added in Foot Notes the doctrines and practices of the French Surgeons, which serve to exhibit a comparative view of the present state of French and English Surgery.

The Author has, like other systematic writers, availed himself of the labours of his predecessors, and incorporated into his

Work the received doctrines of the Schools, but he has advanced nothing that his own experience does not sanction; and when he has ventured to differ from the received opinions, he has taken pains to assign his reasons for so doing, and trusts that he has been always actuated by a spirit of liberality.

24. George Street,
1. Jan. 1819.

CONTENTS.

INTRODUCTION.

Pag.

EXHIBITING A VIEW OF THE DOCTRINES OF INFLAMMATION IN GENERAL, WITH ITS VARIOUS TERMINATIONS,........ 1

Local Symptoms of Inflammation,........ 2

Constitutional Symptoms of Inflammation,........ 8

Causes of Inflammation,........ 14

TERMINATIONS OF INFLAMMATION,........ 23

Resolution,........ 27

Adhesion,........ 43

Suppuration,........ 53

Mortification,........ 61

Scirrhus,........ 77

Effusion,........ 78

Ulceration,........ 80

DIVISION OF INFLAMMATION,........ 83

CHAPTER I.

HEALTHY INFLAMMATION,........ 85

PHLEGMON,........ ib.

TREATMENT OF PHLEGMON,........ 87

Pag.
Acute Abscess, 90
Treatment of Acute Abscess, 92

CHAPTER II.

UNHEALTHY INFLAMMATION, 95
SECTION I. FURUNCULUS OR BOIL, ib.
TREATMENT OF FURUNCULUS, 96
SECTION II. ANTHRAX OF CARBUNCLE, 98
TREATMENT OF CARBUNCLE, 99
SECTION III. ERYSIPELAS OR ROSE, 100
TREATMENT OF ERYSIPELAS, 103
SECTION IV. CHRONIC INFLAMMATION, 105
Chronic Abscess, 107
Treatment of Chronic Abscess, 109

CHAPTER III.

SPECIFIC INFLAMMATION, 117
SECTION I. SCROPHULA, 118
TREATMENT OF SCROPHULA, 120
SECTION II. VENEREAL, 124
Gonorrhœa Virulenta, 132
Treatment of Gonorrhœa Virulenta 139
Swelling of the Testicle, 146
Treatment of Swelling of the Testicle, 149
Gonorrhœal Ophthalmia, 152
Treatment of Gonorrhœal Ophthalmia, 155
Gleet, 157
Treatment of Gleet, 159
Stricture of the Urethra, 163
On the Manner of ascertaining the Situation, Form, and Extent of the Stricture, 169

Pag.
Methods of Cure,............170
1st, The Common and Metallic Bougie............174
2d, The Caustic or Armed Bougie,............177
Ulceration of the Urethra and Urinary Fistula......182
Treatment of Ulceration of the Urethra and Urinary Fistula,............184
LUES VENEREA............187
Chancre............189
Treatment of Chancre,............191
Bubo,............200
Treatment of Bubo,............205
CONSTITUTIONAL LUES,............209
Venereal Affections of the Throat, Nose, and Mouth 210
Venereal Blotches or Eruptions of the Skin,............214
Nodes and other advanced Symptoms,............215
Treatment of Lues Venerea,............218
On Mercury, with its Modus Operandi in the Cure of Syphilis,............227
SECTION III. CANCER,............235
TREATMENT OF CANCER,............245
Medical Treatment,............ ib.
Surgical Treatment,............249
SECTION IV. FUNGUS HEMATODES,............259
TREATMENT OF FUNGUS HEMATODES,............263

CHAPTER IV.

ULCERS,............265
SECTION I. LOCAL ULCERS,............275
Simple Healthy Ulcer,............ ib.
Treatment of the Simple Healthy Ulcer,............276
Irritable Ulcer,............279
Treatment of the Irritable Ulcer,............280

Pag.
Indolent or Callous Ulcer,....283
Treatment of the Indolent or Callous Ulcer,....284
Fungous Ulcer,....295
Treatment of the Fungous Ulcer,....297
Carious Ulcer,....300
Treatment of the Carious Ulcer,....301
Herpetic Ulcer,....304
Treatment of the Herpetic Ulcer,....308
Cancerous Ulcer,....313
Treatment of the Cancerous Ulcer,....317

SECTION II. CONSTITUTIONAL ULCERS,....323
Scrophulous Ulcer,....324
Treatment of the Scrophulous Ulcer,....325
Scorbutic Ulcer,....327
Treatment of the Scorbutic Ulcer,....332
Venereal Ulcer,....334
Treatment of the Venereal Ulcer,....338
Mercurial Ulcer,....339
Treatment of the Mercurial Ulcer,....343

CHAPTER V.

WOUNDS,....346
SECTION I. WOUNDS IN GENERAL,....346
Means of suppressing Traumatic Hemorrhage,....349
Incised Wounds,....356
Treatment of Incised Wounds,....357
Punctured Wounds,....366
Treatment of Punctured Wounds,....368
Poisoned Wounds,....369
Treatment of Poisoned Wounds,....375
Lacerated and Contused Wounds,....378
Treatment of Lacerated and Contused Wounds,....385

Pag.
Gunshot Wounds,......389
Treatment of Gunshot Wounds,......392
Traumatic Tetanus,......397
Treatment of Tetanus,......401
SECTION II. OF PARTICULAR WOUNDS,......408
Wounds of the Head,......ib.
Wounds of the Face,......419
Wounds of the Throat,......425
Wounds of the Breast,......432
Wounds of the Belly,......444
Wounds of the Extremities,......463

CHAPTER VI.

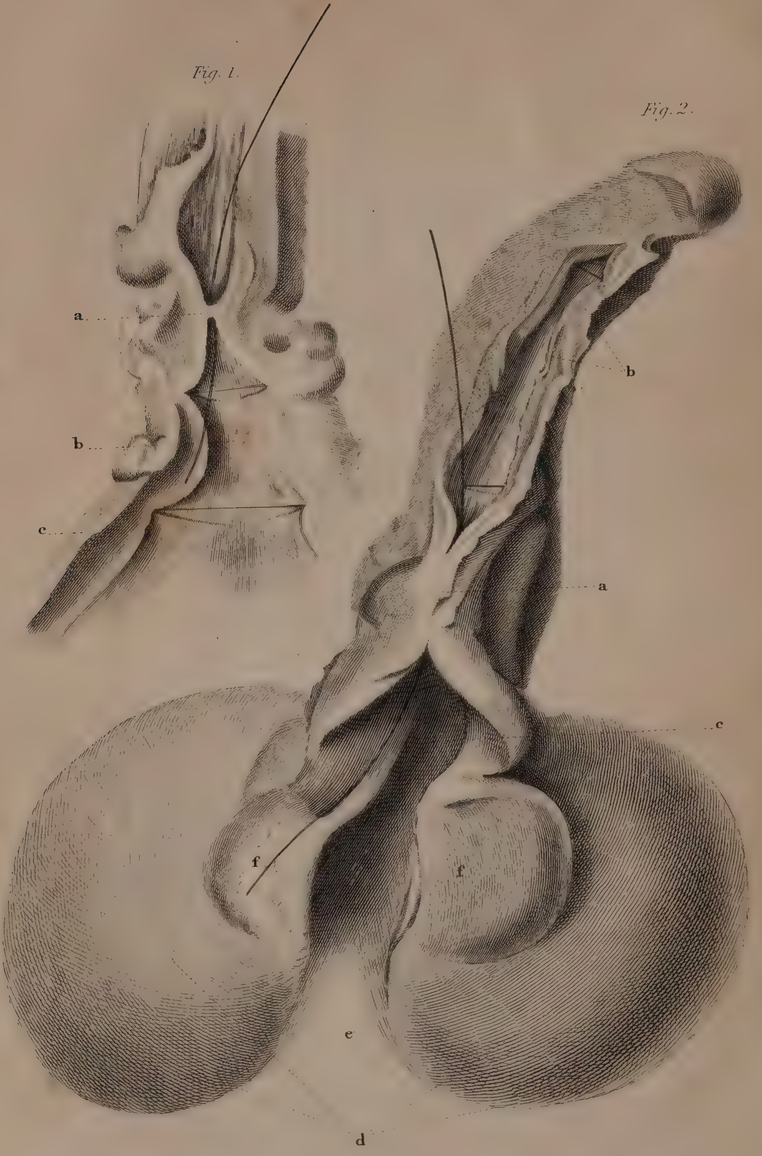
BANDAGES,......479

ERRATA.

Page 4th, line 19, for *horny* read *warty.*
70th, —— 5, for *urine* read *wine.*
75th, —— 16, for *application* read *applications.*
84th, —— 21, for *or* read *and.*
105th, —— 18, for *muscular* read *vascular.*
146th, —— 22, for " If this state of" read " *In this state, if*"
156th, —— 28, after " a day" insert a semicolon, and after " bed-time" a comma.
211th, —— 30, instead of a period insert a comma.
253d, —— 2, for *was* read *is.*
272d, —— 26, for *nol.* read *noli.*
358th, —— 28, after " posture" insert a comma.
361st, —— 13, after " *in*" read *extensive.*
380th, —— 8, read " *a great bloodvessel.*"
390th, —— 21, } for *splintered* read *splinter.*
399th, —— 1, }

Fig. 1.

Fig. 2.



Engd by W. & D. Lizars Edinr

EXPLANATION

OF THE

PLATES.

PLATE I.

This Plate illustrates the two varieties of Stricture, with some of its consequences, such as thickening of the coats of the bladder, and dilatation of the urethra, behind the strictured point. Fig. 1. represents a stricture of small extent. The stricture is situated in the membranous part of the urethra, immediately behind the bulb; the urethra behind the stricture is seen considerably dilated, and the coats of the bladder much thickened. The patient died of retention of urine, and the stricture was so complete, that even after death, it would not permit a probe to pass.

a, the Stricture.

b, the Urethra, behind the stricture, much dilated.

c, a portion of the bladder, near its neck, its coats much thickened.

Fig. 2. represents the Urethra strictured to some extent: here the dilatation of the canal behind the stricture, and the thickening of the bladder, are more strongly marked than in the preceding figure. The bladder had been punctured above the pubes, several years before the patient's death, when the retention of urine had become complete.

a, the Urethra contracted to the extent of half an inch, the stricture is situated at the bulb, and felt as hard as cartilage.

b, points out a contracted portion in the anterior part of the Urethra, about three inches from the orifice, a common seat of stricture.

c, the Urethra, behind the stricture, considerably dilated.

d, the external surface of the bladder.

e, the cut edge of the bladder, shewing the coats much thickened.

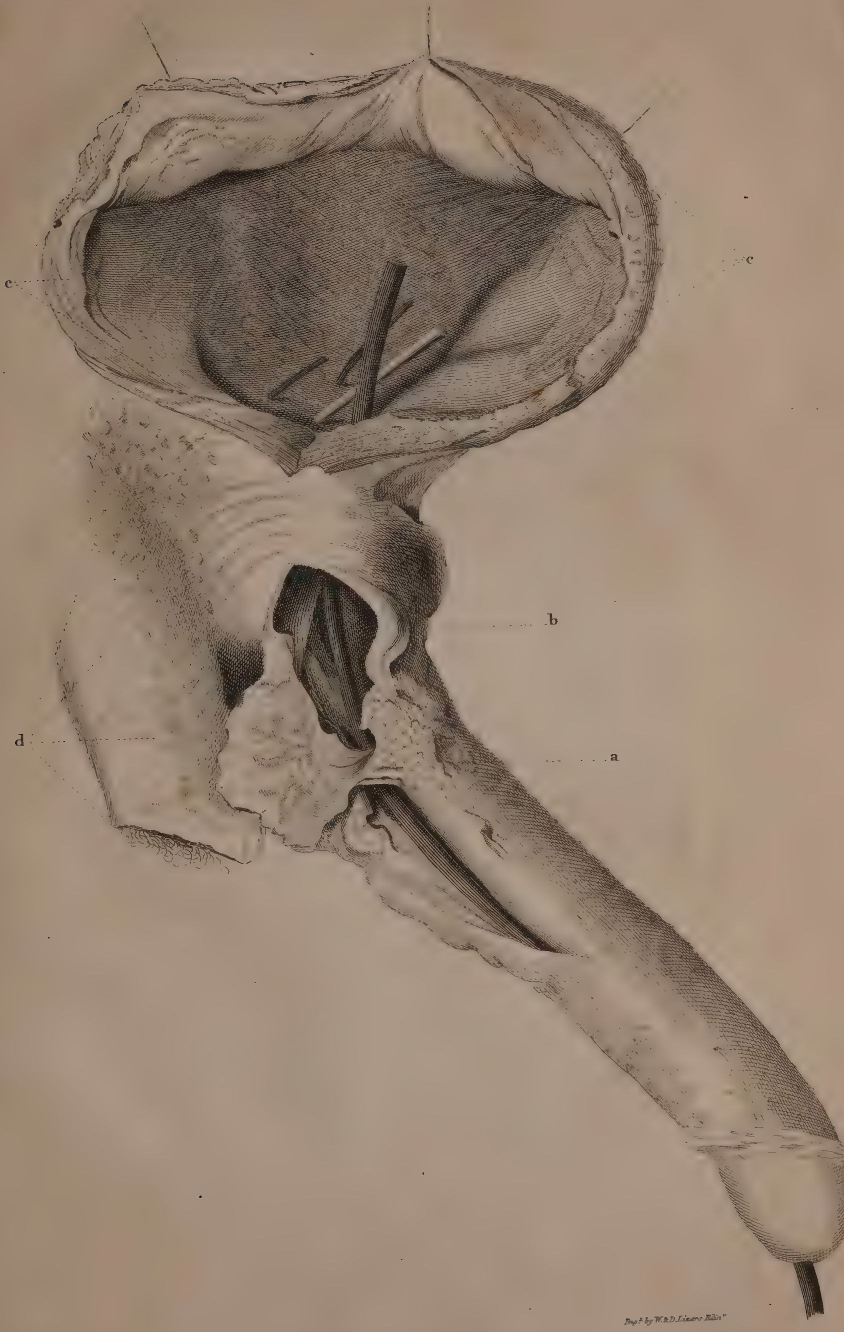
f, the Prostate Gland enlarged, and cartilaginous.

PLATE II.

This drawing is intended to represent rather the consequences of stricture than the disease itself. It occurred in a man about forty years of age in consequence of gonorrhœa, and the obstruction became so complete as to force me to puncture the bladder from the rectum. The thickened state of the bladder, and the dilatation of the urethra behind the stricture, are particularly well seen. The preparation is preserved in my collection.

This gentleman, about the year 1793, when in Russia, contracted a gonorrhœa which lasted six months. After the disease disappeared, he observed that he passed his urine in a diminished stream, and sometimes with considerable difficulty. The disease continued to increase. He was told that he had a stricture in his urethra, and as his distress was greatly increased by the excessive cold of that climate, he came to Edinburgh to his relations, and put himself under the care of Mr B. Bell, who attempted the cure of the stricture by the common bougie, but finding that little progress was made, he went to London and applied to Sir Everard Home. This gentleman applied the lunar caustic for a considerable length of time, and ultimately forced the stricture with a silver catheter. He was considered cured, and returned to follow his usual employment of clerk to a mercantile house. He remained well for many years, when he again observed the stricture to return without any evident cause. For five years previous to the puncture of the bladder, he was frequently so ill as to have a complete retention of urine for 24 hours. On these occasions, no instrument, however small, could be passed into the bladder, but he was always relieved by warm fomentations, large opiates, and blood-letting.

PLATE 2.



Engd by W. & D. Lizars Edinr

I was first called to this patient on the 3d of February 1811, about 10 o'clock at night. He had passed no urine from the morning, and was at that time in great distress. He had himself applied the fomentations, and taken upwards of two hundred drops of laudanum in the course of the day, which he was always accustomed on those occasions to take in very large quantities. I found it impracticable to pass the smallest bougie; I repeated the fomentations; ordered warm water to be thrown repeatedly into the rectum, and a clyster of the mucilage of gum arabic, containing 100 drops of laudanum, taking at the same time 18 ounces of blood from his arm. He passed the urine about 3 o'clock in the morning.

I now advised him to have recourse to the caustic bougie, which he promised to do, but he had contracted a habit of taking large doses of laudanum. He lay continually in bed; his general health was quite ruined; he was unable to follow any business; his spirits were depressed, and I heard no more of him till the 28th of July 1811, when he again laboured under a total retention. All means of procuring relief proving ineffectual, I punctured the bladder from the rectum after the retention had continued for 30 hours, and drew off about five pounds of very turbid urine, the latter part of which was mixed with pus. The canula was allowed to remain till the 3d day, when it was withdrawn. He complained of no pain during the operation. The second morning after the canula was withdrawn, he could pass no urine either by the rectum or urethra, and began to feel very uneasy from the distension of the bladder. Upon being sent for, I found that this was occasioned by the rectum being loaded with fæces. When it was emptied by a clyster, he passed the urine easily by the puncture. After the canula was withdrawn, the urine continued to flow by the rectum, not continually, but only when he made an effort to expel it.

I now applied the Caustic Bougie to the Stricture. In a few days the urine flowed by the urethra, although in a small stream, and the puncture healed up; but although he recovered from the operation, the structure of the parts was so destroyed, and his health and mind so completely ruined, that I never could prevail upon him to get out of bed. He continued to swallow his large doses of laudanum, and died in a month after the operation.

In the drawing, a bougie is passed along the urethra; the canal is laid open for a little way, both anterior and posterior to the stricture; two small whalebone probes are introduced into the mouths of the ureters in the bladder, and a white bougie is inserted into the place of puncture. It is worthy of remark, that the opening made by the trocar in the rectum was entirely healed up, but remained open in the bladder.

a, the Stricture, situated immediately anterior to the bulb, and as hard as cartilage.

b, the Urethra behind the Stricture, so much dilated as to form two pouches, each capable of containing a small chesnut; the internal surface was much ulcerated, and the sacs were full of matter.

cc, the cut edges of the Bladder; the structure of which is so changed as to be half an inch in thickness.

d, the Rectum stuffed with hair, which is seen protruding at the anus.

PLATE III.

This Plate illustrates the formation of a false passage, occasioned by the caustic bougie applied for the destruction of a stricture situated immediately anterior to the bulb. This drawing also shews some of the consequences of stricture.

a, the Stricture.

b, a small Bougie, introduced into the false passage leading to some extent into the cellular substance under the pubis on the left side of the urethra. At this point, a portion of the canal is seen enlarged from the action of the caustic.

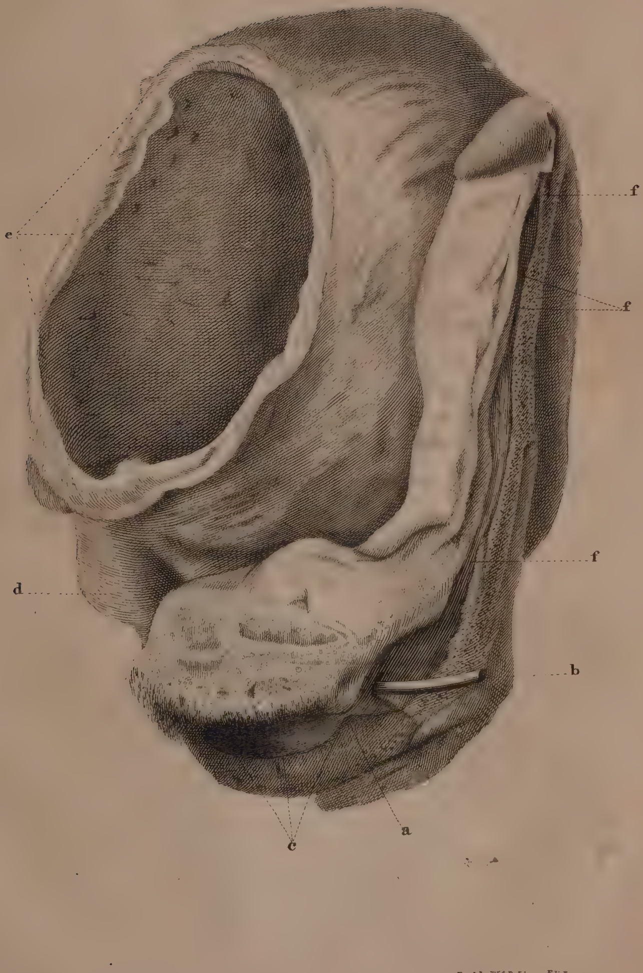
c, the Sinus of the Urethra, and its membranous portion dilated and involved in ulceration.

d, the Prostate.

e, the cut edges of the Bladder much thickened.

f, f, f, contracted portions of the canal anterior to the principal stricture.

PLATE 3.



Eng.d by W. & D. Lizars Edin.r

INTRODUCTION,

EXHIBITING

A VIEW OF THE DOCTRINES OF INFLAMMATION IN GENERAL, WITH ITS VARIOUS TERMINATIONS.

As Inflammation follows every surgical operation and local injury, the study of this subject belongs peculiarly to the province of the Surgeon; and, as it is the most simple as well as the most general disease, the investigation of its various phenomena, causes, and terminations, forms a proper introduction to a system of Surgery.

The existence of inflammation is denoted by redness, increased heat, pain, and swelling. These phenomena manifest themselves with more or less rapidity, in a greater or less degree, and are accompanied with more or less fever, according to the sensibility or structure of the part which is affected; according to the extent of the seat of the disease; and according to the importance of the organ in the animal oeconomy.

The general division of inflammation by surgical writers has been into two kinds, Acute and Chronic.—When the disease proceeds rapidly, when the local symptoms are distinctly marked, and when the constitutional ones are severe, the inflammation is said to be acute. When the disease is slow in its progress, when the local symptoms are mild, and when the constitutional ones are absent or not perceptible, it is called chronic. Pleuritis, Peritonitis, and Phlegmon, are instances of the former. The inflammation of scrophulous habits, such as that which precedes lumbar abscess, is an example of the latter; but an inflammation may be of the acute kind in its earlier stages, and, after having subsisted for some time, become chronic. This is particularly exemplified in Ophthalmia, where the acute stage is marked by great heat, violent prickling pain, as if excited by the presence of sand in the eye, increased flow of tears, and intolerance of light; while the chronic stage is characterized by the relaxed state of the vessels, little or no increase of heat, absence of the prickling pain, and diminished sensibility.

LOCAL SYMPTOMS OF INFLAMMATION.

We have said that the existence of inflammation is marked by REDNESS, INCREASED HEAT, PAIN, and SWELLING; and the observations we have now to offer, apply chiefly to healthy inflammation.

Redness.—The first symptom then of inflammation is an increased redness of the part. This redness is very evident in the white of the eye in Ophthalmia, and in the pleura and peritoneum in inflammation of these membranes. It is the consequence of a greater influx of blood. The red capillary vessels become enlarged, and the serous vessels admit the red globules; hence, in an inflamed part, a greater quantity of blood must always circulate than in a state of health. From the enlargement of the red capillaries, and the injection of the serous ones with red blood, it must appear that both these orders of vessels are the seat of inflammation. The larger capillaries always carry the red blood from the extreme arteries to the veins; the serous vessels admit only the serum; but by some impelling power, which we shall presently shew to be the action of the arteries, the red globules are forced into the serous vessels; therefore these vessels must be enlarged in their diameters.

This injection and enlargement of the serous vessels in inflammation, are beautifully illustrated by the experiments of Mr Hunter. They are also demonstrated by the redness of the tunica conjunctiva, and of the pleura and peritoneum, membranes which, in their natural or healthy state, are transparent, but which, when inflamed, are found upon dissection to possess a high vascularity, which can be rendered still more evident by injection.

This increased redness of a part immediately follows the application of chemical and mechanical stimuli, as is exemplified in Mr Hunter's experiment of the incision of the dog's thigh.* And, in one particular case, Mr Hunter "applied a caustic to the ball of the great toe of a patient every other day, for more than a month, and, after each application, the surrounding parts put on a blush, and all the veins on the top of the foot, as well as up the leg, immediately began to swell, and became large and full. This was so remarkable, that the patient watched for this effect, on the days on which the caustic was applied, from its happening only on those days."

There is at present under my care an elderly gentleman, in whom this increased redness, after irritation, is very conspicuous. I am in the habit of applying caustic once or twice a week to a small ~~horny~~ warty excrescence, situated on his left cheek. The superficial blood-vessels are seen very distinctly like the branches of a tree, ramifying in different directions. I no sooner apply the caustic, than those ramifications enlarge and encrease in numbers, inosculating with each other till the whole becomes one general blush of a circular form, which continues for several hours after the caustic has been applied.

---

* See Hunter on Inflammation.

Increased heat.—The next local symptom of inflammation, is increased heat. Without entering into any discussion respecting the origin of animal heat, I may shortly observe, that this increase of heat always follows an increase of vascular action, and an increased influx of blood. This increase of heat is perceptible to the surgeon, determinable by the thermometer, * and is always more or less distressing to the patient in proportion to the degree of action and sensibility of the organ affected. This increase of heat is more perceptible in the external than in the internal or deep-seated parts of the body; hence in fever the internal heat is not increased above the standard of health, while that of the skin is morbidly augmented, particularly in the palms of the hands and soles of the feet, where there is little perspiration.

Pain.—The third local symptom of inflammation we enumerated, was pain. Wherever there is an increased circulation in the vessels of a part, there is increased sensibility, as in the mucous membrane of the trachea in catarrh, and in the eye in ophthalmia; and the pain is always in proportion

---

* Although we enumerate an increase of heat among the local symptoms of inflammation, and although this heat is very distressing to the patient, still we find upon the application of the thermometer, that the heat is increased only a very little above the healthy standard.—*See* Hunter *on Inflammation.*

to the natural sensibility of the organ, to the rigidity of its texture, and to its degree of motion or muscular contraction. Organs of great sensibility, as the eye, the ear, the skin, the schneiderian membrane, &c., are, when inflamed, extremely painful, because their natural sensation is acute. Parts, which have a profusion of nerves, are also plentifully supplied with blood-vessels; and when the circulation is increased, the nervous energy is roused, and the pain is excruciating. *

Again, in unyielding textures as the bones, the pain is also very acute, because these structures do not favour that effusion from the serous vessels which moderates the action, and forms the swelling which is so prominent a feature in inflammation.

But inflamed parts become painful not only from natural sensibility or from their rigidity of

---

* The vascular and nervous systems so intimately depend upon each other, that we may lay it down as a fixed principle, that those parts which are liberally supplied with blood-vessels, for the purposes of nutrition, are also plentifully supplied with nerves. This assertion is not contradicted by the consideration of the great vascularity of the spleen, liver, or kidney; for although these organs have large and numerous blood-vessels, and little sensibility, and although the kidney be at once the most vascular and least sentient viscus in the body, still the blood-vessels are not so much intended to nourish those viscera as for the secretions or other offices these organs are destined to perform.

texture, but also from their muscular contraction. Inflamed parts, which have a great degree of motion, are exquisitely painful, while parts which have no motion have, comparatively speaking, little pain. Thus the bladder, when inflamed, contracts every ten minutes, and the pain is excruciating. When the stomach or intestines are inflamed, and most especially when obstructed from the constant motion to which they are subjected, now preternaturally encreased, the pain is most violent, whereas parts which can be kept quiescent have much less pain.

Swelling.—The swelling, the last local symptom of inflammation, arises partly from the increased influx of blood, but chiefly from the effusion of the serum. From the violence of the vascular action in the series of vessels leading immediately to the seat of the inflammation, the serum is effused into the adjoining cellular substance; this swelling or effusion moderates the action, and consequently lessens the pain. The pain is immoderate, and of long duration, in those organs which do not yield so as to permit the effusion, as in the bones, tendinous sheaths, and other firm and unyielding structures; and the swelling is always more or less extensive, in proportion to the quantity of surrounding cellular structure, or the looseness of texture, which favours the effusion.

CONSTITUTIONAL SYMPTOMS OF INFLAMMATION.

SYMPTOMATIC FEVER.—When the inflammation is of small extent, or situated in a part of the system remote from the heart, the only phenomena which present themselves are redness, increased heat, pain, and swelling, which are denominated the local symptoms of inflammation; but when any organ of importance in the animal economy is affected, or when the inflammation is extensive, there succeeds an increased action of the heart and whole arterial system, accompanied by headache, hurried respiration, full and flushed countenance, foul and dry tongue, thirst, hot and dry skin, nausea, loss of appetite, pain of loins, urine in small quantity and high-coloured, costiveness: in fine, all the secretions are suspended, and sometimes the intellectual functions more or less deranged.

These phenomena have been called symptomatic fever, which is just the common idiopathic inflammatory fever of medical writers, or the synocha of Cullen and other nosologists. Symptomatic fever is, therefore, nothing but idiopathic inflammatory fever, with the local symptoms of inflammation superadded. But there is some variety in the order in which the constitutional and local symptoms present themselves; for sometimes the local, and sometimes the febrile symptoms have the precedence, according to the nature of the inflammation; whether it springs from a constitutional or local cause, or is the offspring of a specific constitutional affection. Thus the febrile symptoms precede the local in erysipelas, small-pox, measles, and other eruptive diseases; but in inflammation following local injury, the local symptoms of course always precede the febrile; and in inflammations of the great cavities, or any of their viscera, they generally occur nearly about the same time.

It appears, then, that the difference betwixt simple inflammatory fever or synocha, and inflammation, consists in this; that inflammatory fever is an increased action of the heart and arteries with an equal distribution of the blood. In consequence of this increased action, all the functions are disturbed, and all the secretions suspended;—the secretion of saliva is suppressed, hence the dryness and foulness of the tongue, and increased thirst;—the perspiration is checked, hence the increased heat of the surface, particularly the burning heat of the palms of the hands and soles of the feet, where, from the thickness of the cuticle, the perspiration is naturally less. The glandular secretion into the bowels is suppressed, hence the costiveness;—the action of the kidney is deranged, hence the scantiness and high colour of the urine. The function of nutrition is suspended, hence the accumulation of fibrin or coagulating lymph in the circulating system, and the appearance of what has been called the buffy coat;—inflammation with symptomatic fever, is nothing but the same increased vascular action with a determination to some particular organ, which organ is the seat of the disease.

Independently of the febrile or constitutional symptoms, it has been imagined that the blood indicates pretty accurately the presence of inflammation, when it exhibits what has been called the buffy coat. When blood is drawn from a vein and allowed to remain for some time at rest, it spontaneously separates into two parts; one solid, and the other fluid. The solid part is called the coagulum or crassamentum; it is surrounded by, and sinks in the fluid, which is called the serum. If the coagulum be removed, and laved repeatedly with water, the colouring matter will be washed out, leaving the coagulum white; or if the blood be stirred briskly with a bunch of rods when newly drawn, the coagulating matter will be collected white on the rods, and the colouring matter will be mixed with the serum. It, therefore, appears, that the blood consists of three parts: the colouring matter or red globules, which is the heaviest part of the blood; the washed coagulum or cake, which is named the coagulating lymph or fibrin, the next in specific gravity to the red globules; and the fluid surrounding the coagulum, which is denominated the serum, and which is the lightest part of the blood. When these component parts are mixed together, and circulating in the vessels of a living animal, they form a fluid apparently homogeneous, which does not coagulate as long as the blood remains in the living vessels; but whenever the blood is removed from the vessels, it coagulates, and this coagulation takes place in more or less time, according to the rapidity with which it has been circulating, and according to the living influence of the vessels, or to the powers of contraction in the heart and arteries.

No sooner is the action of the heart and arteries accelerated, than the animal functions become disturbed, and the secretions (including nutrition) suspended; hence in fever or increased action of the heart and arteries, we perceive that the fibrin prevails in greater quantity, is firmer, and bears a greater proportion to the serum and red globules than when the operations of the system are more regularly performed, and the functions less disturbed. This superabundance of coagulating lymph or fibrin, which is the pabulum intended for the purposes of nutrition, prevails both in inflammatory fever and in pregnancy; and in these states it would appear that there is a diminished nutrition, as the human body at these times always becomes thinner.

The quickness or slowness of coagulation will make the blood present different appearances, and the buffy coat seems to depend upon the slowness of coagulation conjoined with the great proportion of fibrin that is present in the vessels. If the blood coagulates quickly, the red globules have not time to subside, but are fixed and completely incorporated with the fibrin, which is then of a uniform red colour; but, if the circulation is rapid, and the blood long in coagulating, the red particles by their superior gravity fall to the bottom of the cake, and being proportionably fewer in number, the surface of the fibrin is wholly or nearly free from them, exhibiting a bluish or whitish cast, which has been called the buffy coat.*

The appearance of the buffy coat does not decidedly mark the presence of inflammation, but only indicates suspended secretion, or at best can be received only as an indirect proof of the existence of inflammation: 1st, Because, during pregnancy, where the blood is circulating with increased force, and where there is disturbed secretion, we see this buffy coat although there be no inflammation: 2dly, Because inflammation may exist in a part for some time; and if blood be drawn from a vein, it will not exhibit the buffy coat till the irritation has extended to the heart and arteries, and the function of secretion has become disturbed: 3dly, Because, in inflammation we frequently find the buffy coat in the first and second bleedings, and not in the subsequent ones, although we know by the local symptoms that the inflammation is not subdued: 4th, The buffy coat frequently appears in incipient gangrene from preternaturally increased action, because this action has suspended the secretions, and produced an accumulation of fibrin: and, 5thly, In bleeding, if the arm be long tied up before the vein is opened, the component parts of the blood have a disposition to separate, and the first cup will exhibit the buffy coat, but not the subsequent ones.*

---

* That the buffy coat is nothing but coagulating lymph or fibrin, is proved chemically by the experiments of Deyeux and Parmentier. *Vid. Jour. de Phys. Vol.* 44.

I would, therefore, say, that the buffy coat rather indicated the velocity of the circulation, and consequent disturbed nutrition, than inflammation; and in determining the propriety of repeated blood-letting in any inflammatory complaint, would trust more to the pain in the seat of the disease, the firmness and cup-like appearance of the coagulum, than either to the pulse or buffy coat.

When the inflammatory diathesis prevails, the coagulum or crassamentum is always firm, and the surface concave or cupped, indicating superabundance of fibrin, and strong coagulation.

---

* See HUNTER on *Inflammation.*

CAUSES OF INFLAMMATION.

The causes of inflammation have been divided into two kinds; the Remote or Exciting Cause, and the Proximate Cause.

Remote causes.—The remote or exciting causes of inflammation are so palpable, that all writers are agreed on this head. They either act first locally, and then extend to the system; or they first influence the system, and then manifest a local effect. Of the former, are all chemical and mechanical stimuli. The chemical stimuli are caustics, rubefacients, blisters, and some animal poisons. The mechanical stimuli are blows, bruises, wounds and other accidents, and surgical operations. Those that first affect the system, and then produce a local inflammation, are peculiar contagions; as small-pox, measles, &c. Cold has been long observed to be a principal remote or exciting cause of inflammation, and it acts both locally and on the system; but its exact mode of operation has never been satisfactorily explained.

Proximate cause, or theory of inflammation.—On this subject, there has been a variety of opinion. Every writer has advanced some new doctrine; but the most extensively received theories have been those of Boerhaave and Cullen.

Boerhaave and the humoral pathologists maintained the proximate cause of inflammation to be obstruction in the extreme vessels. This they believed to depend upon a lentor or viscidity of the blood. They conceived, that from a variety of causes the thinner parts of this fluid were dissipated; that the thicker part choaked up the minute vessels which were the seat of the inflammation; and that either the series of arteries immediately adjoining, or the heart and whole arterial system, were thrown into a state of increased action, to overcome the remora or obstruction. This gave rise to heat and pain, and the obstruction itself to redness and swelling; thus they accounted for the local phenomena of the disease. They also perceived the red globules admitted into vessels which in a healthy state did not receive them, as into the serous vessels of the eye in ophthalmia; this they denominated an error loci, and believed to be another and frequent cause of obstruction, and consequent inflammation. But this lentor or viscidity of the blood has never been detected; and if it did exist, it ought to produce a general affection, and not a local disease. That the red globules are found in the serous vessels in inflammation, constituting an error loci, is sufficiently evident: however, this never happens till the disease has subsisted for some time, and always follows but never precedes the increased action of the arteries; consequently, it always presents itself as an effect, and never as a cause of inflammation.

When this doctrine of lentor, remora, and error loci prevailed, pathologists ascribed every disease to the blood and humors, and nothing to the solids; hence it was denominated the humoral pathology; but no sooner was the origin of diseases transferred from the fluids to the solids, than a new theory of inflammation and fever arose. Dr Cullen, founding his doctrine upon the spasmodic theory of Hoffman, ascribed inflammation to 'a spasm in the extreme vessels, exciting an increased action in the arteries;' and this increased action was sometimes confined to the arteries of the part, and sometimes extended to the heart and whole arterial system.

We thus see that both the theories of Boerhaave and Cullen consider inflammation as consisting in obstruction, and consequent increased action of the vessels. That there is an increased action of the arteries immediately leading to the seat of the disease, and sometimes extending to the whole arterial system, is manifest; but, without having recourse to the doctrine of spasm, to lentor, or to any kind of obstruction to excite and support this increased action, I do not see why an increased action may not take place in any series of arteries, from the application of chemical or mechanical stimuli morbidly increasing the irritability of the vessels through the medium of the nerves.

Whether or not the arteries exert any living action, has been a subject of some dispute.—The affirmative is generally admitted. some, however, have denied it, contending that the action or pulsation of the arteries is not occasioned by any power inherent in themselves; that they are merely elastic tubes, and that their contraction depends solely upon their previous dilatation, produced by the blood propelled into them by the contraction of the heart; from which it would follow, that the arteries leading to an inflamed part cannot contract oftener than the heart contracts. To shew the fallacy of this opinion, it may be proper to prove; 1st, That the arteries are muscular tubes, and that they circulate the blood by an inherent power independently of the heart, and consequently that the action may be accelerated in any series without affecting the rest, causing an unequal distribution of the blood; and, 2dly, That this increased action takes place in the arterial ramifications nearest to the seat of the inflammation, or that the arteries leading to an inflamed part contract either oftener or more forcibly and fully, than those leading to the same part in a state of health.

Baron Haller, from not being able to discover nerves going to the middle coat of the arteries, denied its muscularity; and from being unable to excite their irritability by mechanical or chemical stimuli, believed that no inherent contractile power resided in them, and that the blood was circulated by the impulse of the heart alone.

This opinion, although far from being generally received, has still been maintained by some writers. They, no doubt, admit that the arteries contract upon the contained blood; but this they ascribe to elasticity, and not to muscularity.* Now, if the arteries were not muscular tubes, and their contraction depended solely upon elasticity, although they might second the stroke of the heart in circulating the blood, the number of contractions could not be locally increased, but must be the same throughout the whole arterial system; or, in other words, the arteries leading to an inflamed part could not contract oftener than the arteries leading to the other parts of the body; but the action of the whole arterial system must be regulated by the action of the heart.†

---

* One of the greatest physiologists of the present day ascribes the action of the larger arteries, not to their muscularity, but to elasticity. *Vid.* RICHERAND'S *Elements of Physiology.*

† That the arteries possess elasticity as well as muscularity, is proved by the following simple experiment.—Cut out a portion of aorta from any dead animal; extend it, and it will be found not only to stretch but to return to its former shape, with the same resilition as a piece of elastic gum. This elasticity

That the blood is not circulated by the impulse of the heart alone, but that the circulation is assisted and maintained by a contractile power in the arteries, independent of the action of the heart, and not resulting from elasticity, can be distinctly made out by a variety of proofs.

1st, After death, the arteries are always found empty, and in a relaxed state. This shews that their contraction does not depend entirely upon their elasticity; for if it did, they should, when empty, always be in a state of contraction.

2d, That the arteries possess a local and independent action, is evident in the erection of the penis from the venereal orgasmus; in the excited and turgid state of the female parts in coition, and in those of the lower animals when in season; in the increased activity of the vessels of the uterus during pregnancy; in the increased vascularity of the testicles of the lower animals during the season of copulation; in the act of blushing from affections of the mind; and in that augmented force of pulsation which frequently precedes hemorrhagy.

3d, A local action of the arteries is also evinced in the secretion of bone, in the growth of tu-

---

may assist the action of the arteries; but that their contractile power depends chiefly on their muscularity, is, I think, fully established by the proofs given in the text.

mors, and in the evolution or enlargement of the female breast at puberty.

4th, We see in several diseases an increased determination of blood to a particular organ, as to the head in apoplexy, evincing an unequal distribution.

5th, The pulsation is stronger in the healthy than in the paralytic limb of the same subject.

6th, In ossification of the semilunar valves, the heart often contracts twice, or there is a double stroke before the artery contracts; and the artery always becomes smaller, from being less vigorously opposed by the heart.

7th, In those monsters which have no heart, and in fishes where there is none but for the pulmonary circulation, the blood must be moved through the body by the impulse of the arterial system alone.

8th, When a limb is torn off by a mill or other piece of machinery, the artery is so deadened or paralysed, that no bleeding follows. Now, if the arteries were not muscular tubes; and if the blood were circulated by the heart alone, this could not happen, and the patient would bleed to death before any clot could be formed.

9th, Muscular fibres can be traced in the middle coat of the arteries; and these fibres are very distinctly seen both in the larger and smaller orders of these vessels.

We thus see that the arteries not only circulate the blood independently of the heart, but that their action may be locally increased; or that one series of arteries may have an increased action without affecting the rest, causing a greater determination to one point; and, that this is the state of the arteries leading to an inflamed part, is proved by the strong throbbing which can be distinctly felt in the digital arteries leading to the seat of a whitloe, while no throbbing can be felt in the arteries of the finger of the opposite hand; and if the inflammation be violent, this strong pulsation extends even to the wrist. † It is also proved, by dividing the arteries leading to an inflamed part, when the blood will be propelled with increased force, so as to be thrown to a greater distance than from the same vessels in a state of health, although the number of the contractions of the heart and general arterial system are not increased beyond the natural standard.

From the foregoing considerations, it appears to me that we may assume the following positions as established: 1st, That in inflammation, that series of arteries immediately adjoining or leading to the seat of the disease, is in a state of increased action, and that this increased action some-

---

* Hunter on *Inflammation*.

times extends to the heart and whole arterial system: 2d, That both the red capillaries and serous vessels are the seat of inflammation: 3d, That from the blood being propelled into these vessels with increased force, they will become enlarged in their diameters; and the consequence of this must be, that the blood circulates in them more slowly than in a state of health independently of obstruction. In an inflamed part, therefore, a greater quantity of blood must always be accumulated than in a state of health.

From this view of the subject, it appears, that in inflammation there are two distinct states of the circulating blood, and two states of the vessels. In the arteries leading to the inflamed part, the blood must be moving with greater velocity; and in the capillaries, the immediate seat of the disease, the blood must be circulating with less velocity, or moving more slowly than in a state of health. Now with respect to the vessels, it is manifest, that those leading to the inflamed part must be acting with greater force, while the capillaries, the seat of the disease, must be acting with less force than they were wont to do previously to the attack of the inflammation.*

---

* Boyer, chief surgeon of La Charitè, one of the first surgeons in France, and author of a system of surgery, which in

TERMINATIONS OF INFLAMMATION.

THE terminations of inflammation are resolution, adhesion, suppuration, mortification, scirrhus, effusion, and ulceration. † Each of these terminations is apt to occur, according to the structure of the part in which the inflammation is situated; according to the nature of the re-

---

France is the reigning system of the day, assigns as the proximate cause of inflammation, ' the afflux of blood, and its obstruction in the capillary vessels of the inflamed part.' But the afflux of blood, and its obstruction in the capillary vessels of the inflamed part, instead of being considered as the proximate cause, should rather be denominated the proximate effect or the inflammation itself. Again, under the same head of proximate cause, he observes, that ' the opinion now most generally received, is, that inflammation is produced by irritation.' That irritation induces inflammation, is most certain; but the irritation must be viewed as the remote, and not as the proximate cause, the proximate cause of the inflammation being the peculiar action which that irritation excites in the arteries, nerves, or both, of the part to which the irritating power is applied.—*Vid. Traitè des Maladies Chirurgicales, Vol. I. par* M. LE BARON BOYER.

† The generality of the English writers enumerate only three terminations of inflammation, resolution, suppuration, and gangrene; but in the sequel we shall find all the seven which I have enumerated to be legitimate. The French writers enu-

mote cause which produced it; and according to the violence of the disease.

It has long been observed, that inflammation was more or less easily excited, more or less severe, and had various terminations according to the structure of the part which was affected. But it is only of late years that we have particularly attended to structure as modifying the terminations of inflammation; and to Mr Hunter, the author of many original observations on this subject, we are indebted for a variety of illustrations.

As instances of structure modifying the terminations of inflammation, we may adduce the following:

1st, Unhealthy inflammation of the skin (erysipelas) generally terminates either in resolution or in gangrene.

2d, When inflammation is situated in the cellular substance, it most commonly ends in resolution or abscess.

---

merate five, viz. delitescence, resolution, suppuration, induration, or scirrhus, and gangrene; and some writers of that nation add a sixth metastasis. The difference betwixt delitescence and resolution, is, that in the former the inflammation is suddenly arrested without having fully developed itself; whereas in the latter the inflammation is gradually dissipated, after having manifested all its phenomena. *Vide* Lassus, Richerand, Boyer, *and other French Surgical writers.*

3d, When the inflammation attacks mucous membranes, as the lining membranes of the nose, trachea, œsophagus, stomach, intestines, urethra, or vagina, it terminates in suppuration, or ulceration. It is more apt to become chronic, and has a greater tendency to recur in this than in any other structure.

4th, When serous membranes are affected, as the pleura, the peritoneum, the inner surface of the pericardium, the cavity of the tunica vaginalis, or the capsules of joints, the inflammation terminates in adhesion or effusion.

5th, When the stomach or intestines are affected, it frequently terminates in gangrene.

6th, When the muscles are inflamed, as in rheumatism, it ends in resolution, or by a gelatinous effusion into their tendinous sheaths; here also the inflammation frequently becomes chronic: And,

7th, In parts of a glandular structure, as the mamma or testicle, the inflammation is apt to terminate in scirrhus.

Though the proximate cause must be the same in every inflammation, the remote causes are subject to great variety, and upon this variety frequently depends the termination of the disease. Thus, in unhealthy inflammation of the skin, (erysipelas), if the inflammation arises from a febrile affection, if it follows a wound in intemperate habits, or takes place from distension of the skin in anasarca, it is apt to terminate in gangrene. In the latter case, it is particularly apt to occur when the part is scarified with the lancet; but if the inflammation arises from external injury, as in wounds of the scalp in a constitution labouring under no marked disease, and depending on a bilious habit, it ends in resolution; which termination may be accelerated by a few doses of any saline cathartic. Again, inflammation of the eye, arising from contagion, as that preceding purulent ophthalmia, terminates in suppuration; while that which arises from cold, or from irritation from foreign bodies, ends in resolution. Inflammation of the brain, or its meninges from local injury, most frequently terminates in suppuration, while this termination is rare from any other cause. Inflammation of the fauces either terminates in resolution, suppuration, or ulceration, according to the cause which produces it, whether arising from cold or venereal infection; and, lastly, inflammation of the joints, when arising from scrophula, has a termination different from that which follows external injury.

The violence of the inflammatory symptoms has also a very manifest effect in modifying the termination of the disease. An inflammation, mild both in its febrile and local symptoms, will terminate in resolution, while one which is violent in these two sets of symptoms, though situated in the very same structure, will terminate in suppuration or in gangrene.

In serous membranes, when the inflammation is not very violent, it terminates in adhesion; but when there is an excess of the inflammatory action, it terminates in effusion. This is exemplified in the adhesion of the lungs to the pleura, and in the adhesion of the testicle to the tunica vaginalis in the slighter cases of inflammation; and in the production of hydrothorax and hydrocele from the more violent attacks of the disease. Lastly, When the mucous membranes are inflamed, and the inflammation very slight, there is merely an increase and slight acrimony of the natural secretion. When the inflammation is more violent, there follows a discharge of pus; and if more violent still, the disease ends in ulceration.

Of all the terminations of inflammation which have been enumerated, resolution and adhesion are the most desirable, because both these set limits to disease, and the part then returns to its healthy action.

RESOLUTION.

WHEN the action of the vessels abates, when the pain ceases, and when the heat, redness, and swelling gradually subside, the part being restored to its natural function, the inflammation is said to terminate by resolution; and this termination may either take place spontaneously, or be effected by art.

When the resolution takes place spontaneously, it arises from the effusion of the serum or of the fibrin, or of both, (but most probably chiefly of the serum), into the surrounding cellular substance, which moderates or suspends the arterial action; hence, in proportion as the swelling increases, the action abates, and the pain becomes more obtuse, till both action and pain finally cease, and the inflammation is resolved.

Again, when the resolution is effected by art, it is either accomplished by those powers which repress the action in the vessels leading to the inflamed part, or by those means which promote the effusion from the serous and red capillary vessels in the seat of the disease. Cold applications, as saturnine lotions, belong to the first; the relaxing powers of heat, with moisture, as warm poultices and warm fomentations, belong to the latter. Hence, when we use cold applications in inflammation, we cure by repressing the action; when we use warm fomentations, we cure by promoting the effusion.

It is this effusion which causes that thickening of the cellular substance and change of structure which so frequently occur after inflammation, and which sometimes require weeks, or even months, to resolve. But sometimes this effusion of the albuminous part of the blood becomes so organized, as not to be readily absorbed, but for ever after impedes the function of the part.

Whatever tends to depress the powers of the system, or lessen vascular action, has a powerful influence in effecting resolution ; and this is to be accomplished both by remedies and diet. The remedies may be applied either to the general system or to the part affected, or to both. Hence they have been very naturally divided into General and Local ; and in their application, this seems to be a good rule of practice ; that when the inflammatory action is local, the remedies should be local ; but when the action extends to the system, or when the heart and arteries are affected, the remedies should be general as well as local.

The general remedies seem to act chiefly in three different ways; either by lessening vascular action, and thus immediately depressing the powers of life ; by causing a more general distribution of the blood, and a greater flow to the surface and extreme parts ; and by throwing an increased action on some other organ. The local remedies may be applied with four views, either to lessen the action of the vessels of the inflamed part, or rather those immediately leading to it ; to excite a counter irritation or an action in the external vessels, by which the internal are relieved ; to lessen irritation, and promote effusion from the inflamed vessels ; and, lastly, to constringe the enlarged red capillaries and serous vessels. The remedies employed to effect this, however, are more applicable to the passive than to the active stage of inflammation.

General Remedies.—The general remedies employed, with a view to effect resolution, are blood-letting, purging, sweating, and the warm bath. Blood-letting is more imperiously called for in some inflammations than in others, as in inflammations of the great cavities; and the three others, purging, sweating, and the warm bath, seem each to have a preference, according to the seat of the disease. Thus purging is found to be more efficacious in inflammatory affections of the head than in inflammations of the chest, and sweating and the warm bath in rheumatism, and in inflammations of the thorax and abdomen, than in affections of the head. We shall also find among the local remedies some which claim a preference to others, according to the structure of the part, or the seat of the disease.

1st, Blood-letting.—Blood-letting is the great and important remedy in inflammation. Whenever the action has extended to the system, it should be immediately had recourse to; and in all inflammations of the great cavities, its use is indispensible. Purging, sweating, and the warm bath, are no doubt powerful auxiliaries; but when compared to blood-letting, they must be viewed as minor remedies. Blood-letting lessens the force of the arterial contractions; depresses the powers of life; suspends the inflammatory action; and its effect is immediate. We shall, therefore, find our practice more or less successful, according to the period of the disease in which we have had recourse to blood-letting, according to the quantity drawn at one bleeding, and according to the rapidity with which it is abstracted. Thus, venesection, to the extent of ten ounces, a few hours after the commencement of the disease, will have more effect than three times that quantity after it has subsisted for twenty-four hours; and if the patient be freely and largely blooded at first, it will be more efficacious than three or four subsequent bleedings, each repeated to the same extent; that is, two pounds drawn at one time will have more effect than four pounds taken at four different times. Blood-letting, I say, is also of effect in proportion to the rapidity with which it is discharged: Thus, ten ounces taken from a large orifice, in a few minutes has more effect in inducing that state of the system favourable to the cure of inflammation, than twenty ounces taken in a small stream in twenty minutes; for when the blood is slowly abstracted, the blood-vessels have time to contract, and adapt themselves to the remaining quantity, which they soon do; consequently, the bleeding is of much less utility than when the blood is quickly abstracted. These remarks are particularly applicable to internal inflammation. It ought, therefore, to be an object with the practitioner in inflammation of the great cavities, to bleed as early as possible, freely at the first, and and from a large orifice. If he has been called in the commencement of the disease, he may abstract blood in such quantities, and so quickly, as to induce fainting. This he may do with perfect safety, as it can only tend to produce resolution; whereas, if the disease has been allowed to go on uninterruptedly for some days, bleeding must be used with more caution; as profuse bleeding might lead to some other termination, perhaps to effusion or gangrene.

Although in incipient inflammation there is no remedy more powerful than bleeding to syncope, yet after the disease has subsisted for some time, no practice is more dangerous, as it frequently leads to effusion or gangrene. This distinction demands the attention of the young surgeon, as the directions to bleed to syncope are too indiscriminately given. In syncope, the arteries empty themselves as in the last moments of life, and the blood is accumulated in the veins; consequently, all action is suspended for a time, or at least is very languid.

Thus we see, when a patient faints from being largely blooded, the lips, face, and other parts of the surface, assume a deadly paleness from the empty state of the arteries; and in opthalmia, even the florid appearance of the tunica conjunctiva disappears, and it continues of a white colour till the action of the part becomes strong, and the arterial circulation is restored.

It should therefore be a rule in the commencement of inflammation, to bleed freely, and from a large orifice, so as to induce fainting, by which we lessen the quantity of the blood in the arteries, and suspend their action. The military and naval surgeon has it more in his power to apply this rule, than a surgeon practising in the circles of domestic life, who is frequently not called till the advanced stages of diseases.

When we bleed freely in the commencement, we either entirely subdue the disease, or give it a decided check in the first twenty-four hours; whereas, when we neglect this, or have it not in our power, we are obliged to bleed repeatedly; there are frequent relapses, and the disease runs an uncertain course of a fortnight or three weeks. This profuse bleeding is only applicable to inflammation of the great cavities. In lesser inflammations, we do not bleed so profusely. In fact, bleeding in inflammation must be regulated by the seat and the violence of the disease, the age and strength of the patient, and other circumstances; but let it be remembered, that when the increased action is confined to the series of arteries immediately adjoining the seat of the disease, local blood-letting is proper, and may be employed with manifest advantage; but when the increased action extends to the heart and whole arterial system, local blood-letting is nugatory and inefficacious. The blood should be abstracted from the general system.

2d, Purging.—The remedy which ranks next in efficacy to bleeding in the cure of inflammation, is purging. Purges should be liberally employed. They not only unload the bowels and remove general irritation, but they cause a greater determination of blood to the intestines, increase the abdominal secretions, and, by irritating the villous coat, throw an increased action on the whole inner surface of the intestinal canal. Purging is found to have much more efficacy in inflammations of the head and abdomen than in those of the chest; and the cathartics which have generally been employed, are those of the saline kind. They were thought by the older physicians to cool the blood, and they are still employed for this purpose; independently of their purgative quality, they are powerful refrigerants, and possess a direct sedative power. The cathartics which rank next to those of the saline class, are those which excite the greatest irritation, and increase the action of the villous coat, as calomel, gamboge, aloes, &c.; and these are found to be remarkably useful, where, from a peculiar idiosyncrasy, the inflammation has a particular tendency to recur, as inflammation of the brain, the eye, or the trachea. They should, therefore, in such cases be liberally used, as they cause a greater determination to the bowels, and thus relieve the irritable or predisposed organ. When the inflammation is situated in the stomach or intestines, and when cathartics are rejected by vomiting, clysters should be liberally used.

3d, SWEATING was the third general remedy we enumerated. Diaphoretics are powerful auxiliaries, particularly in internal inflammations, as in those of the thorax and abdomen, and also in rheumatism. They have a powerful effect in carrying the blood to the surface, and relieving the internal organs, and those parts which have a consentaneous or sympathetic action with the skin. It ought to be our object rather to keep up a continued mild diaphoresis than induce a profuse sweat; and to effect this, the best remedies are the antimonial medicines in small doses, as they also lessen the quickness of the circulation by the nausea which they produce. For this purpose, we employ small doses of the pulvis antimonialis, or oxidum antimonii cum phosphate calcis; the tartarite of antimony, or antimonial wine. I have been long in the habit of using a six ounce saline mixture, made of the carbonate of potash, neutralized by citric acid. Into this mixture, I put a drachm of antimonial wine, and direct two table spoonfulls, or half a wine glassful, to be taken every two hours.

4th, WARM BATH.—The warm bath is the last general remedy we mentioned. It has a powerful effect in bringing the blood to the surface and to the extremities, and thus causing a more general distribution. It is particularly serviceable in inflammations of the thorax and abdomen, as in those occurring after the operations of hernia and lithotomy, and also in rheumatism; but the heat should never be higher than from betwixt 92 and 96 of Fahrenheit, and the patient should never remain longer in it than ten or twelve minutes, because it exhausts, and frequently induces fainting. It is, therefore, better to repeat it, than continue it too long at any one time.

Besides these general remedies employed to effect resolution or the cure of inflammation, the strictest attention must be paid to diet. The patient must be placed upon what has been called the antiphlogistic regimen, or low diet. He must avoid animal food, and all kinds of spirituous and fermented liquors; and for drink, only take toast and water, barley-water, rice-water, apple-tea, whey, and such like diluting fluids. If the inflammation is not very violent, and no important organ is affected, he may indulge in milk and water, water-gruel, or very weak chicken-water, but the greatest caution must be used; and even when the inflammatory symptoms are completely gone, a considerable interval must elapse before he ventures to return to solid food or strong liquors, as the inflammation is easily reproduced; the system is long irritable, and easily excited by stimuli. I have frequently seen a relapse produced, by returning too soon to animal food. When once a part has assumed a diseased action, that action is easily reproduced. Hence a primary object in the cure of disease, is to break the force of habit by counter irritation, or by throwing the action on some other part of the system.

Local Remedies.—The local remedies employed in the cure of inflammation, are, 1st, Topical Bleeding. 2d, Cold Applications. 3d, Caustics, Blisters, and Rubefacients. 4th, Heat; and, 5th, Astringents.

The first intention with which we use local applications, is, to lessen the action of the vessels in the inflamed part, or rather of those immediately leading to it, and this is to be effected by local blood-letting, and by cold applications; as cold affusion or cloths dipped in cold water; saline solutions, as solutions of the muriate of soda, the muriate of ammonia, the acetite of ammonia, and the preparations of lead, vinegar, &c. The second indication, is to excite a counter irritation, or an action in the external vessels by which the internal are relieved; and this is to be effected by caustics, blisters, and rubefacients, which inflame the skin. The third object in view, is to lessen irritation; and this is to be effected by the relaxing powers of heat with moisture, as warm fomentations, warm saturnine lotions, poultices, &c.;

and the 4th and last object, is to constringe the enlarged capillaries, which is to be effected by solutions of alum, of the sulphate of zinc, and some other saline substances.

1st, Topical Bleeding.—The abstraction of blood directly from the part inflamed, or the immediate vicinity, is a powerful remedy in the reduction of local inflammation; and this is to be effected either by leeches or the scarificator. The leeches produce least irritation, and are the most manageable. On this account, I think they are to be preferred: however, if they cannot be conveniently obtained, we must have recourse to the scarificator. Topical blood-letting lessens the quantity of blood circulating in the part, and diminishes the action of the vessels immediately adjoining the seat of the disease; and this it effects in the same manner as the effusion. When the inflammation is phlegmonic, and situated in the skin and cellular substance, we take the blood directly from the inflamed part. When it is situated in a joint, we abstract it from the skin immediately above it; and when the inflammation is in the eye, we apply the leeches or scarificator as near to the part inflamed as possible, as to the temple. Here, as in general blood-letting, the blood should be freely drawn, and repeated as often as necessary.

2d, Cold Applications.—The cold applications, like blood-letting, subdue the action of the vessels leading to the inflamed part; and by allaying the irritability of the nerves, lessen the pain. They also tend to constringe the enlarged capillaries, the seat of the disease. They comprehend cold affusions, cloths dipped in cold water, saline solutions, the preparations of lead and vinegar. Cold affusion, or cloths dipped in cold water, in saline solutions, or in vinegar and water, are particularly useful in inflammation of the brain, and in ophthalmia; and Dr Brown, (the author of the Elementa Medicinae), for the cure of cynanche tonsillaris, or inflammatory sore-throat, was in the habit of ordering a worsted stocking to be dipped in cold water, and applied to the throat during the night. The preparations of lead are the most generally employed, and are the most efficacious, independently of the cold, they possess a direct sedative power; for we find them also useful, when applied a little warmed. The best preparations are solutions of the acetite of lead, with a small proportion of vinegar, or a mixture of the aq. litharg. acet., with water in proportions adapted in strength to the sensibility of the organ, and the violence of the disease.

When we use cold applications, we should apply them to the neighbouring parts as well as to the seat of the disease, as they act chiefly in subduing the action in the vessels leading to the inflamed part. Hence, in ophthalmia, bathing the fore-head and temples repeatedly with cold water, has a marked effect in subduing the inflammation.

3d, Caustics, Blisters, and Rubefacients, inflame the skin, and excite an increased action in the superficial vessels, by which the action in the internal is relieved. The effects of this class of medicines are very conspicuous, and are well illustrated by the operation of the caustic issue in diseased spine, and in the morbus coxarius or inflammation of the hip-joint, by the application of the actual cautery to the surface of inflamed joints, by the effects of blisters and sinapisms in inflammation of the tonsils, in pleurisy, and in an inflamed rheumatic joint, and by the inflammation produced in the skin by mustard, turpentine, tincture of cantharides, and other rubefacients in chronic rheumatism. The operation of these remedies does not depend upon the discharge, but upon the external inflammation, for the pain ceases, and the inflammatory action is removed as soon as the skin inflames, and long before there is any discharge.

4th, Heat.—Although cold applications are most frequently employed as topical remedies in the cure of inflammation, yet cases frequently present themselves, in which the cold applications, far from relieving the pain, and lessening the inflammation, aggravate all the symptoms, and produce so much pain as is hardly supportable. This appears to be the case in very irritable habits, when the inflammatory action is violent, and when it is situated in unyielding structures, as in the bones, coats of the eye, and glands. We are therefore in those cases compelled to lay aside the cold applications, and have recourse to warm; the best of which are warm fomentations, warm saturnine poultices, warm solutions of opium, and warm solutions of lead.

These, independently of lessening irritation, seem to resolve the inflammation principally by promoting that serous effusion by which spontaneous resolution is effected. Where the pain is very acute, where the inflammatory symptoms are violent, the disease far advanced, and situated in unyielding structure, warm applications are the most proper. Again, where the inflammation is less active, and more especially when in its incipient stage, we should have recourse to cold. A good rule is to be regulated by the feelings of the patient: Therefore, when the cold applications produce pain, we try warm. However, I am of opinion, that nothing but warm applications should be used in glandular inflammation, as cold applications applied to a gland in a state of active inflammation are very apt to produce schirrus: in inflammations of the testicle or mamma, the preparations of lead should always be applied warm, and conjoined with fomentations.

5th, Astringents.—Astringent solutions, as the solutions of alum, or the sulphate of zinc, are more adapted to the passive than to the active stages of inflammation. However, they may be used where the inflammatory action is not very violent, and we frequently employ them in the inflammations of mucous membranes; as in purulent ophthalmia, in gonorrhoea, and in discharges from the vagina.

All these general and topical remedies are more or less efficacious, according to the violence of the disease, and according to the earliness and freedom with which they have been employed. If the pain abates, while the heat and redness become less conspicuous, we may look for Resolution; and the cessation of the pain is the most certain criterion of success. But if the pain, heat, and redness continue unabated, or other symptoms afterwards to be mentioned, supervene, we have to fear some other termination.

ADHESION.

Adhesion, next to Resolution, is the most desirable termination of inflammation. It sets limits to diseased action, and is a process in the animal oeconomy the most extensively useful, whether we view it as the means employed by nature to terminate inflammation, or as the subject of a great practical doctrine in surgery. The adhesive inflammation presents to us a series of the most wonderful phenomena that fall under the observation of the surgeon. A knowledge of the laws which govern it is of great importance, and its application to wounds and operations is universal. It is the knowledge and application of adhesive inflammation that has given modern so decided a pre-eminence over ancient surgery. The application of this doctrine was discovered by a sort of chance. Its value was first manifested in the practice of quacks, and it was long before it was received into the regular practice of surgery. We are indebted to Mr Hunter for a knowledge of its laws, and chiefly to Messrs Allanson and Benjamin Bell for its application to operative surgery; for it was not till their time that its doctrines came to be applied to practice.

When inflammation exists in a cavity, as in the abdomen or thorax, the local disease is not only limited in its extent, but also terminated by adhesion between the opposite surfaces; and there are certain structures which are peculiarly susceptible of this form of adhesive inflammation; in the same manner as there are structures more susceptible of the ulcerative or suppurative inflammation than of any other. Those most susceptible of adhesive inflammation are serous membrane and cellular substance, because these structures more readily favour the effusion of the albuminous part of the blood contained in the serum; hence, when any injury is offered to the serous or internal coat of an artery, as when it is torn, cut, or bruised by a ligature, if its sides be laid in contact, it no sooner inflames than it adheres; and when the lungs and pleura, or when the intestines and peritoneum are inflamed, the inflammation is most commonly terminated by the opposite surfaces adhering; for as soon as the opposite surfaces adhere, the inflammation ceases, and to favour the adhesive inflammation, it is necessary that the parts be in contact. When adhesion takes place in a circumscribed cavity, it sets bounds to the inflammation, which ceases; but when adhesion does not follow, the inflammation overspreads the whole sac or cavity. This is well illustrated in wounds of the abdomen, where, as soon as the intestine adheres to the peritoneum, the dangerous symptoms cease. *

---

* For many beautiful illustrations of adhesion terminating inflammatory action, and setting limits to disease, see Mr Hunter on Inflammation.

There are many marked occasions where adhesion is conspicuously useful, and even saves the life of the patient. In inflammation of the thorax or abdomen, the adhesion of the lungs to the pleura prevents dropsy or empyema; adhesion of the intestines to the peritoneum prevents dropsy or gangrene; when a piece of intestine is engaged in intususceptio, the included part frequently mortifies and sloughs off, but before this happens, the same process completely unites the two sound portions; the gangrened portion is evacuated by stool, and the continuity of the canal is preserved. When a portion of gut is herniated, strangulated and gangrenes, the same inflammation which terminates in gangrene of the protruded portion, terminates in adhesion of the sound to the peritoneum, or fixes the sound intestine at the groin, which not only sets limits to the spreading of the inflammation, but prevents the gut from retiring, saves the foeces from being poured into the abdomen by establishing an artificial anus, which in course of time, sometimes heals up, and the stools are again ejected per anum. In wounds of small extent in the stomach or intestines, the contents do not escape into the abdomen, but the reciprocal pressure of the diaphragm and abdominal muscles keeps the internal wound opposite to the external, in the course of a day the bowels and peritoneum inflame and adhere. The inflammation does not extend beyond the point of adhesion, and the foeces are poured out at the wound. When the liver inflames and suppurates, it uniformly adheres to the points with which it is in immediate contact, to the colon, to the diaphragm, or to the abdominal peritoneum; and when the abcess bursts the matter does not pass into the abdomen but points outwardly, escapes into the colon, and is discharged by stool, or passes through the diaphragm, and is coughed up from the lungs.

In peculiar structures as serous membrane and skin, the slightest inflammation or excoriation produces adhesion; hence, upon dissection we frequently find the lungs adhering to the pleura, although before death there were no symptoms which indicated such adhesion; and so sure and universal is this process of adhesion, that if we do not interpose a piece of oiled lint, or linen spread with ointment, betwixt inflamed and ulcerated surfaces the inflamed and excoriated surfaces will adhere; hence, after burns, we frequently see parts which have been permitted to remain in contact, adhering as the fingers or toes to each other, and not unfrequently the chin to the breast.

Adhesion seems to be effected by the formation of a new substance deposited betwixt the inflamed surfaces. In consequence of the increased arterial action, an effusion takes place of the serous part of the blood, the watery part of which is readily absorbed, leaving the albumen into which new vessels shoot. The whole soon becomes completely organized, and thus the inflamed parts are united. This deposition of albumen is particularly conspicuous in inflamed viscera, which we frequently see connected by membranous cords.

The connecting medium, then, by which surfaces adhere, is the albumen of the serum effused, or perhaps secreted by the arteries during their increased action. It is also by the effusion of this albumen becoming organized, that the intestines adhere to the peritoneum, or to each other; and the lungs to the pleura after inflammation of the abdomen or thorax; and there are certain circumstances which favour or retard this adhesive process. It only takes place in sound constitutions. It is also necessary that the inflammatory action be moderate, and that the parts be in contact; for by excess of inflammation the part either suppurates or mortifies; and in those parts where adhesion would occur, if kept in contact, suppuration invariably follows, if the surfaces be kept separate.

When the constitution is sound, when the parts are kept in accurate contact, when no foreign body is interposed, when the inflammation is moderate, and when every circumstance is favourable for adhesion, it is wonderful how surely and speedily parts separated by incision unite, if there be the least connection betwixt the separated part and the body. This ensures the union.

A young boy (a midshipman) about twelve years of age, of a light and slender form, was playing on the main deck, at the top of the after hatchway, leading down to the lower deck, in a ship of war. He slipped his foot, fell back, and was precipitated down the hatchway, a height of six or seven feet. He pitched his head upon the edge of an iron bar at the bottom of the ladder, which made a clean incision through the scalp, beginning about two inches above the right eye, and extending to the very back part of the occiput. It bled profusely, but the bleeding soon ceased, as the vessels were small. I shaved the head. The scalp was so loose, that I could with difficulty keep it from slipping down over the ear, while I was shaving it. I washed away the blood with water and a sponge, brought the lips into accurate contact, retained them in that situation by means of adhesive straps, and bound up the head with a handkerchief. On the third day, when I undressed it, to examine the state of the parts, I found that it had completely adhered, except at one small point, not exceeding a quarter of an inch in length, where the head was first struck, and which was contused. In the place of the wound, there was a long seam. It looked as if it had been glued together, or sewed with a fine thread. Here there was a most extensive wound, traversing the whole head, running from the eye to the bottom of the occiput, yet it healed in three days like the hare-lip.

The hare-lip, or a wound of the scalp, affords the most perfect example of adhesion; but this process is not necessarily confined to the soft parts, but even extends to the bones. Thus, when the scalp is struck obliquely by a cutlass or sabre, carrying off a portion of the skull, if the integuments be laid down with the attached portion of bone, they will immediately adhere. Although the hand or foot be nearly cut across, yet if the parts be carefully replaced, and supported by splints and bandages, they will all reunite. Even if the bones of the arm or thigh be divided by a clean cutting instrument, still if the principal arteries of the limb are entire, adhesion will take place; and in parts of less importance, as a nose, finger, or toe, although completely insulated, if replaced before the principle of life is gone, they will adhere. The bones are formed and regenerated like the soft parts; are endowed with the same principle of life; partake of the same diseased actions; and when wounded, will with equal readiness reunite. *

---

* For wonderful examples of adhesion, consult the works of Dionis, Le Dran, Turner, Garengeot, and other great practical surgeons. Where a continuity is maintained betwixt the wounded parts, it is generally allowed, that reunion will take place; but that an insulated part will reunite, is denied by some of the best writers. Indeed, the notion has generally been treated with ridicule. Cases, however, have lately occurred, where the fingers have been chopt off, remained insulated for some

There are some minor circumstances, which it is necessary for the surgeon to attend to,

---

time; and yet, when replaced, have reunited; (see Balfour on Adhesion.) The result of two of these cases I have seen; and the fingers, although entirely separated, have yet so completely adhered, as again to form a part of the living body.

As establishing the fact of the reunion of nearly insulated parts with divided bones, and serving as a good lesson to the young surgeon, I subjoin the following case from De La Faye:

"A man received on the arm a wound with a hatchet, which cut obliquely the bone and all the surrounding muscles, having only left entire the cord of vessels inclosed in an inch of skin. The wounded man, with his arm dangling, so that the hand hung almost as low as his knee, had the fortitude to take it with his right hand, and bring it nearly up to his shoulder. They enveloped the part with many cloths, and took him to M. De la Peyronie, who found the wound crammed with cloths and with clots of blood, a distance of eight inches betwixt the two wounded surfaces, and the lower portion of the arm cold, livid, and without feeling, as well as the fore-arm, and hand. In this state of matters, it was so easy to finish the amputation, and there was so little probability of preserving the limb, that several surgeons, who were in consultation with M. De la Peyronie proposed to separate it entirely. But M. De la Peyronie, who had seen some examples of reunion which no one had dared to hope for, wished to make trial of it here. For this purpose, he removed some small detached portions of bone, placed the parts in apposition, and supported them with a convenient apparatus, at the same time making an opening in it to enable him to dress the wound, without disturbing what held the bone in contact. He employed as topical remedies, bran-in order to favour this process of adhesion, such as carefully removing the blood, which must be considered as a foreign body, laying the opposite surfaces neatly together, but not drawing

---

dy, rendered more stimulating with a little of the muriate of ammonia, and did all that was judged necessary either to recall the natural heat, or to prevent accidents.

"On the second day, the arm was a little swelled above the wound, and there was no pulse at the wrist. On the third day, there was a little swelling in the hand and fore-arm. The swelling increased, and there was a little heat in the hand. From the fifth to the eighth day, the heat gradually increased. On the eighth day, the window in the bandage was opened, and the wound looked well. The dressing consisted of pledgits dipped in a solution of colcothar, and of compresses steeped in a stimulating aromatic wine, which was continued till the fourteenth day, when the apparel was removed for the second time, and the wound appeared disposed to reunite. On the eighteenth day, the cicatrix was found advanced, the limb almost in its natural state, and the pulse perceptible. M. De la Peyronie now substituted a roller for the window bandage, taking care to remove it every ten days. After fifty days they removed it altogether; and at the distance of two months from the time of receiving the wound, the patient was entirely cured, except that there remained a little numbness in the limb.

"M. De la Peyronie was encouraged in this undertaking by the example which he had under his care in 1706, of a Swiss soldier, who had the fore-finger of one hand cut in such a manner, that it was only held by a small portion of skin, which joined it to the middle finger; and from these two observations, this author concludes, that we ought on all occathem too tight, or keeping them much on the stretch by means of sutures or plaster, for then they inflame. In the reunion of wounds, the blood should be washed carefully away, the wound exposed for a little to the air, till such time as the small vessels contract, and the general oozing ceases. The opposite lips of the wound are then to be brought neatly into contact, and retained by sticking plaster, the uniting bandage, the interrupted or the harelip suture. In old age, where there is a deficiency of inflammatory action, the suture is preferable, as it excites the inflammation. We observe, that adhesion more readily takes place in youth, than in manhood or old age. In manhood, there is too much inflammation; in old age, too little. In manhood, or middle age, we should therefore avoid sutures, as they raise the inflammation too high; in old age, they may be useful, as inflammation is wanted. *

---

sions to attempt the reunion of parts; that there are no inconveniencies in attempting it, and that often nature requires only to be assisted to accomplish wonders." *See Dionis by* De la Faye.

[*] The immediate reunion of the wound or healing by the first intention, after every operation great or small, is an established principle in English surgery. It is the acknowledged doctrine of the schools, and the rule is so absolute, that there is not a young man who leaves college who does not know it as such, nor is there an army or navy surgeon who does not practise immediate reunion after every surgical operation. It is, however, a received principle among the French surgeons,

SUPPURATION.

THE third termination of inflammation in the preceding enumeration, was Suppuration. When the pain and heat abate; when the redness be-

---

that mediate or secondary reunion, or healing by granulation and suppuration, is preferable to immediate reunion, their best surgeons among whom I reckon Pelletan, Boyer, Dubois, and Dupuytren, after a surgical operation, never attempt to unite the wound either by plaster or suture. Dubois does not even make a point of taking up the smaller arteries, but stuffs the wound with agaric and lint; and Dupuytren, the first surgeon in France, professor of medicine operatoire, to whom I am greatly indebted for his kindnesss, in pointing out to me, when I visited Hôtel Dieu, a variety of interesting cases under his care, explaining to me his doctrines and practices, and gratifying me with an opportunity of seeing him operate; I say, Dupuytren, although he be very careful in securing every bleeding vessel, never brings the edges of the wound together. When he amputates a limb he applies lint upon the bleeding end of the stump, and does not bring the integuments into contact. When he extirpates the female breast, he does not bring the cut edges nearer than an inch, fills the wound with lint, and makes a perpendicular incision, an inch in length, in the center of the lower flap to serve as a drain; into this incision he inserts a slip of linen. When he performs the operation for strangulated hernia, he not only does not unite the wound by the first intention, but actually prevents it from healing by stuffing it with lint; hence, weeks and sometimes months elapse before the wound is entirely healed; and in a comes less conspicuous; when the swelling appears more tumid and pointed; and when an effusion or secretion of a yellow or cream colour takes place from the vessels, with a distinct sense of fluctuation, the inflammation is said to terminate in suppuration. If febrile symptoms have accompanied the inflammation, these disappear, and the pulse becomes soft. If the extent of

---

[illegible] case of very large fungus hæmatodes of the testicle, which I saw this dextrous operator extirpate, he, like Mr Pott, took away no part of the skin, consequently after the removal of the disease there remained a large bag which he filled with lint; he heaped pile upon pile, then a compress, and secured all with a single headed roller passed round the scrotum and body.

Pelletan strenuously opposes the immediate reunion of the stump after amputation of the thigh; he relates six cases which occurred at Hôtel Dieu, of which hospital he is one of the chief surgeons; five patients out of the six (says he) died in a short time of hemorrhagy in the stump, of gangrenous abscess under the badly cicatrized skin, or of metastasis, and only one was saved, who owed his safety entirely to the eruption of pus, which forced the adhesive straps. All these mischances Pelletan ascribes to the bringing of the edges of the wound completely into contact. "All these fatal effects (says he) without doubt, resulted from the complete closure of a wound, which, in spite of all pretensions to the contrary ought to give out blood, it is requisite to give issue either to this blood, or to a suppuration almost absolutely inevitable, as much on account of the extent and nature of the wound, as on account of the number of ligatures which can only produce an irritation, necessarily followed by inflammation and suppuration, or finally by the presence of a bone more or less altered by the action the disease is considerable, and the inflammation acute, this formation of matter is always attended with rigours more or less frequent, and of a shorter or longer duration.

Suppuration takes place with more or less rapidity, according to the structure which is inflamed, and according to the violence of the in-

---

of the saw, and of which every thing shews that we ought to look for exfoliation.'' *Clinique Chirurgicale,* Tom. iii. p. 219.

In the sitting of the National Institute of the 21st of March 1814, Roux, second surgeon of La Charité, read to the class of the physical and mathematical sciences, a memoir "Upon the immediate reunion of the wound after the circular amputation of the limbs in their continuity, and especially after amputation of the thigh." From this memoir I shall make a few extracts as exhibiting the opinions of the French surgeons on this subject. The author, after observing that the English surgeons have been the chief advocates for immediate reunion after surgical operations, proceeds to observe, "so coolly has the immediate reunion of the wound after the circular amputation of a limb been received by the surgeons of other nations, that it has had more opposers than partizans. Perhaps it is adopted by many military surgeons, but the results have not been recorded any where that I know of. This method is only spoken of in a vague manner in the systematic works of surgery. In many of the more modern works it is not even mentioned, and I do not find, that in any of them rules have been laid down according to which it is to be practised. It is a point of practice about which surgeons are so divided in opinion, that its utility is still a matter of question."

So little accustomed has Roux been to the practice of immediate reunion after surgical operation, that he conceives, that after amputation of the thigh, the diversity of structure is flammation. It is most quickly induced in mucous membranes, as in the vagina or urethra. It takes place rapidly when the inflammation is acute; and it is particularly late of occurring in chronic inflammation.

Pus, the product of the suppurative inflammation, was for a long time believed to be formed

---

so inimical to adhesion, as frequently to present almost unsurmountable obstacles to the accomplishment of it, not knowing that this wound will unite as readily and as surely as the wound after the operation for harelip.

" The thigh, says Roux, is the member after the amputation of which, the immediate reunion of the wound promises the greatest advantages. Nevertheless, we should have a false idea of the result of this reunion, if we believed that by it we entirely avoided suppuration; that the divided parts become the seat only of the adhesive inflammation, and that the agglutination can effect this in a very short space of time. The form of the wound, its great extent, the multiplicity of parts which are concerned, differing widely in their structure and vitality, and which it is necessary to put in contact; in fine, the presence of the ligatures which have been required to stop the effusion of blood, and which must be left until the entire closure of the vessels, are so many obstacles to this, that the consolidation of the stump cannot be so quick as we would desire it. The form of the wound does not permit that near the truncated extremity of the bone, the flesh can be put altogether in immediate contact. Since this wound is very extensive, the irritation is too great to allow only the inflammation necessary for adhesion. As it comprehends a number of parts differing from each other in their organization and their mode of vitality, suppuration is therefore easily established, these dissimilar parts not being susceptible of undergoing at once by the dissolution of the solids, or to be necessarily preceded by ulceration; but it is now well known that it is formed without ulceration or loss of substance, as is exemplified in gonorrhoea, and in the purulent discharge from the vessels of the skin after the application of blisters. Boerhaave, and the humoral pathologists, believed pus

---

and in the same space of time, simply the adhesive inflammation. The ligatures which it has been necessary to place in so great a number, are foreign bodies, which add to the irritation inseparable from a solution of continuity so extensive, and which, left between the surfaces of which we have accomplished the contact, break the exact apposition of the divided parts, and excite suppuration. This is, in general, a troublesome necessity, where we have to tie the vessels and place the ligatures on the surface, or upon the edges of a wound which we wish to unite by the first intention: there is no doubt, that if we had the means of avoiding this we should obtain more often primitive reunion without suppuration."

Roux's Memoir applies entirely to primary reunion after amputation of the limbs, more especially of the thigh. "As it is only after the amputations of the thigh, that I have reunited the wound by the first intention, it is to them alone that I particularly allude." *Memoire*, p. 32. He never once speaks of the practice after any other operation; and even in this case, he does not conceive that it should be received as a general rule.

"I cannot but attach," says Roux, "great importance to the observations which I am about to detail, and I confess, that they prepossess me in favour of immediate reunion of the wound after circular amputation of the limb: nevertheless, I am far from thinking that this reunion can be established as a general practice, and that it can be equally applied to every case indiscriminately."

to be effused blood, endowed with particular properties by gradual change. If the sac was opened early, they conceived that it always contain-pure blood; if opened in a latter stage, pus. There is no doubt that if we open a gum-boil, or what we conceive an abscess early, instead of pus, we

---

Roux also conceives, that in the leg and forearm, where the muscles adhere firmly to the bones, and where the bony surface is large in proportion to the soft parts, it is hardly practicable to accomplish immediate reunion.

In the latter end of 1814, and in course of the year 1815, he read at several meetings of the Faculty of Medicine, of l'Ecole de Medicine, a Memoir upon French and English Surgery, the result of observations he had made when on a visit to London in 1814, and which was afterwards published under the title of a Narrative of a Journey to London in 1814, or a Parallel of the English and French Surgery. In this Memoir, he makes some observations upon uniting wounds by the first intention, particularly after surgical operations; he remarks, "But there is nothing so good of itself but has its disadvantages, or which may not be carried to excess. This is particularly true with regard to this immediate union of wounds. There is less inconvenience from not employing it in cases where it might very well apply, than from making it the almost exclusive method of treating wounds. In following one method, we simply deprive ourselves of some advantages; the other, on the contrary, exposes us to risks more or less considerable. I maintain that it is an abuse of the immediate union, to employ it indiscriminately in all cases where it is practicable. It is evidently counter-indicated in a great many wounds, and even in wounds succeeding to operations; or rather, amongst those wounds, which, notwithstanding from the manner in which they have been made, and from the care which may be find nothing but pure blood. This blood seems to be effused in consequence of the violence of the inflammation; but this does not seem to be converted into pus. It is more probable that the blood is first absorbed, and the pus subsequently secreted. That pus is a secretion, was particu-

---

taken to give them one form in preference to another, are much better adapted to the immediate union, than those which are accidental; amongst these wounds, I say, there are some, and a considerable number, for which we must renounce this method of treatment, because its advantages are not sufficiently assured, and because it may be the source of some inconveniencies. A few instances will serve to demonstrate, that in regard to this immediate union of wounds, our practice is more scientific than that of the English surgeons. I shall choose them amongst those which occur daily."

The cases which he mentions are the wounds after castration, aneurism, and amputation. If all the bleeding vessels have been secured, the wound cleared of coagulated blood, and exposed for some time to the air, there is nothing to prevent immediate union after castration, as well as after the extirpation of the mamma, or any other tumor, only from the looseness of the parts, it is necessary to use a few stitches of the interrupted suture, to prevent the lips from turning in, and to keep them more accurately in contact. In fact, from the extent and deepness of this wound, combined with the natural delicacy of the structure, it is more proper to attempt immediate union here than almost after any other operation; because, in this case, the local action is in general moderate, and the constitutional symptoms consequently mild; whereas, when we fill the wound with lint, we increase the irritation, excite high symptomatic fever, endanger profuse suppuration, and cruelly protract the cure.

larly maintained by Mr Hunter, and enforced by a variety of arguments; and this is now the received doctrine of the schools.

The second instance which Roux adduces, is the wound after the operation for aneurism; and here he could not have chosen a more unfortunate illustration, as by it he fully demonstrates, that the doctrines of his countrymen are not only very erroneous with regard to adhesive inflammation, but that their practice in the operation for aneurism is founded upon mistaken principles. We know that the terminations of inflammation are modified both by the structure affected and by the degree of action; thus the inflammation of mucous membranes when not dispelled by resolution, generally terminates in ulceration, and the inflammation of serous membranes in adhesion or effusion. A slight degree of inflammation terminates in adhesion, a greater degree of it induces ulceration, and a still greater degree ends in gangrene. Now we know that the internal coat of the arteries is a serous membrane, that if it be so injured as to induce inflammation, and we lay the sides of the vessel together, it will adhere if the inflammation be moderate; but if the inflammation be violent and long continued, it will end in ulceration. The process in the cure of aneurism is therefore very simple. We make a small incision through the skin and cellular substance in the course of the artery, we open the capsule, separate the artery from its surrounding connections no farther than is just sufficient to permit us to pass round it a single ligature adapted to the size of the artery; we pull this ligature with a moderate degree of firmness, so as to cut, bruise, or injure the internal coat; although we know that it is not necessary to the success of the operation that the inner coat should be cut if the ligature be put even somewhat loose round the artery, so as to obstruct the flow of blood, still it will inflame and adhere. We bring

MORTIFICATION.

The fourth termination of inflammation which we enumerated, was Mortification.

---

the ends of the ligature out of the wound, lay its sides together, secure it by adhesive straps or black court plaster, and the uniting bandage, the serous or internal coat of the artery immediately inflames; its opposite sides are laid in contact: and it no sooner inflames than it adheres. This adhesion extends a little way both above and below the ligature, that part of the artery which is immediately under the ligature runs into gangrene, and thus the ligature comes away, leaving the vessel secure. This simple operation we invariably practise, whether the aneurism be of the true or the false kind. We never open the sac; and if the arterial coats be free from disease, nothing can prevent it from succeeding; whereas in the hands of the French surgeons, it is wonderful that this operation for aneurism should ever succeed. They make a long external incision, lay bare the artery to a considerable extent, open the capsule, and tear it forcibly up from its bed by means of Deschamp's needle. They then place under the artery four large flat ligatures like tapes. These ligatures are kept about two lines distant from each other; the two middle ones they tie, and the upper and lower ones they leave untied. They serve as ligatures of reserve, which are meant to be used if secondary hemorrhage should occur; and, lastly, they cram the wound with lint. Some surgeons (Roux among others) insert betwixt the ligatures and the artery a small cylindrical body, as a bit of lint about an inch in length, and proportioned in breadth to the size of the artery. Over this they lay a strip of linen, dipped

When the inflamed part loses its heat, colour, feeling, and all the principles of life, and becomes more or less of a livid or dark colour, the

---

in melted plaster, or some other firm substance, and then tie the two centre ligatures; or sometimes they apply a metallic instrument, the presse-artere of Deschamp. By these means, they flatten the artery, and lay its sides for some way in contact.

From the artery being insulated to a great extent, from the multiplicity of ligatures, from the insertion of foreign bodies betwixt the ligatures and the artery, and from the wound being crammed with lint, the irritation is so great, that the inflammation which supervenes, instead of terminating in adhesion and suppuration, most commonly terminates in ulceration and gangrene; so that a secondary hemorrhage is brought on by the very means which they employ to obviate it. From this specimen of their management, I am surely entitled to say, that the French surgeons have very incorrect notions of the action of a ligature upon an artery, and conduct their operations for aneurism on very erroneous principles.

The third case which Roux adduces, is the immediate union of the wound after amputation. His sentiments on this head we have already noticed, as contained in his Memoir; but it is worthy of remark, that in the course of one year he changed his opinion most materially. In his Memoir, he expressly says, that in attempting immediate union after amputation of the leg, for reasons he has assigned, "he does not believe adhesion could take place." In the Narrative of his journey to London, written only twelve months after, he says: "My ideas have only changed in regard to one circumstance, which I shall mention. I had shewed but little approbation of the immediate union of the wound resulting from the amputation of the inflammation is said to terminate in mortification; and this change takes place with more or less certainty, according to the structure of the part in-

---

leg, without pretending, nevertheless, that it never ought to succeed, or, still less, that it was impracticable. I have, on the contrary, tried it several times within these few months, and in every instance with success." The truth is, that when Roux wrote his Memoir on Amputation, he had never tried immediate union after amputation of the leg; he had only guessed at it. When he wrote his Narrative of his journey to London, he had tried it several times, "and in every instance with success;" and when he comes to apply the practice more extensively, he will meet with the same success, after every other operation, and every simple incised wound, whether inflicted by accident or design, as he has done after circular amputation.

Deschamp and Percy were charged by the Institute to examine and report upon Roux's Memoir. Percy, the reporter, and the first military surgeon in France, approves of reunion by the first intention, as shortening the cure, and possessing many other advantages, but like Roux he limits the practice to wounds after amputation, and chiefly to those of the thigh; and even here he abandons it, "if the soft parts have been violently contused, or are extremely emaciated."

Notwithstanding the memoir of Roux, and the report of Percy in favour of immediate reunion, or healing by the first intention after amputation, especially of the thigh, the doctrine is not received as an acknowledged principle. It is neither taught in the schools, nor practised in the hospitals; and is rejected by Dubois, Pelletan, Dupuytren, and all the best surgeons in France, who heal by secondary reunion.

Such is the marked difference between the received prinflamed, according to the violence of the inflammation, and according to its origin, as consisting in a constitutional or local cause.

---

ciple of French and British surgical practice on the subject of reunion.

This question of primary or of secondary reunion, is of great importance, embracing a wide range of surgical practice: for there is no operation, however trivial, to which it does not apply. In truth, as inflammation is the first or great leading phenomenon in pathological surgery, so is the doctrine of adhesion the first or great leading principle in operative surgery. If it can be, therefore, substantiated, that secondary is preferable to primary reunion, then has the French a decided superiority over English surgery; but, on the contrary, if it can be proved that primary reunion possesses superior advantages to secondary reunion, then English surgery, as far as regards wounds and operations, has a decided pre-eminence over French surgery.

The only arguments adduced by the French surgeons, against attempting primary reunion, or healing by the first intention, are:

1st, That upon closing up the wound, a consecutive or secondary hæmorrhage is apt to follow; and when this accident does occur, there is danger of its passing unobserved, and proving more fatal than in any other circumstances; because the wound being closed externally, the blood cannot escape, but lodges in the hollow of the stump, insinuating itself into the interstices of the muscles, and producing great disorder.

2d, That an abscess sometimes follows, which terminates in gangrene; and,

3dly, That a metastatis or translation to some other part of

Mortification is of two kinds; one the immediate consequence of inflammation, the other oc-

---

the body, of that matter which they conceive should be discharged by the wound, is apt to take place.

The reasons they adduce in support of secondary reunion, are the following: that the cure is more sure by secondary than primary reunion; and, that the suppuration dispels any sympathetic swelling that may exist in the glands in the upper part of the limb, and prepares the patient for those constitutional changes which occur after the loss of a limb.

These arguments require only slight consideration to show their futility. This secondary hemorrhage after the union of the wound does not in general occur in the practice of the English surgeons: and when it does, it arises from carelessness in not securing those smaller arteries which are apt to bleed after the wound is dressed and the patient laid in bed. But I can readily imagine that this accident might frequently happen to the French surgeons; because, after operation, they are not sufficiently careful to take up the smaller arteries. Healing by granulation and cicatrization, they have been accustomed to stuff the wound with agaric or lint, which suppresses all bleeding from this order of vessels; but when no lint or agaric is applied, and the flaps laid down for adhesion, those arteries, whose bleeding was suppressed from the compression of these substances not being secured by ligature, will bleed after the patient is laid in bed, and fill the cavity of the wound with blood. This seems to be the reason why secondary hemorrhage frequently follows the practice of the French surgeons when they attempt immediate reunion of the wound, while it seldom occurs in the practice of the English.

Their doctrines of metastasis, of the dissipation of sympathetic glandular swellings, and of preparations for constitutional curring without being preceded by inflammatory action; as that mortification which follows sup-

---

changes, effected by inducing suppuration, savour more of the humoral pathology, or rather of the defluxions and humours of the Greek physicians, than of the principles of medicine of the 19th century.

We prefer immediate reunion after every surgical operation for the following reasons:

1st, When we bring the edges of the wound into contact, as soon as the opposite surfaces adhere, all inflammatory action ceases; because adhesion, like resolution, sets limits to inflammation, and all constitutional irritation is at an end: whereas, when the wound is stuffed with lint, great inflammation and swelling always succeed, with great local irritation, and high symptomatic fever; for a greater degree of inflammation is required to produce suppuration than adhesion. The lint adheres so tenaciously to the surface of the wound, that it cannot be wholly removed at the first dressing; and this induces further unnecessary irritation and pain.

2dly, When the operation has been performed in an hospital, the patient in the course of the cure is frequently exposed to hospital gangrene, or to a contagious fever. When this is the case, the gangrene attacks the wound, and the life of the patient is endangered, or at best the cure is cruelly protracted for months. This frequently occurs in the Hôtel Dieu, and other French hospitals, and furnishes a strong motive for attempting immediate reunion.

3dly, When we practise immediate reunion, we frequently effect the cure of the largest wounds in a fortnight, with little local or constitutional irritation; whereas, when we heal by secondary reunion, the wound is sometimes not completely closed in two or three months, especially if extensive, as after ampression of the supply of blood by the application of ligatures, and the ossification of the principal arterial trunks from old age.

When mortification follows suspended circulation, the part at once grows pale, becomes cold

---

putation of the thigh; and from the retraction of the muscles, the stump is of a conical form, the bone is ready to force its way through the tender cicatrix, the patient is unable to bear the pressure upon its surface, and this pressure induces ulceration.

4thly, When we heal by bringing the cut surfaces into contact, we have the wound covered by the natural skin, and the cicatrix reduced to a narrow line; whereas, when we heal by granulation and suppuration, the surface is only covered by newly-formed cuticle, which remains ever after so tender, that upon the slightest irritation it ulcerates, and sometimes forms a troublesome sore.

5thly, After the patient has undergone a tedious suppuration, and the cure has been protracted for months, so much injury is done to the constitution, that a great length of time is required to repair it; and if he be in the decline of life, the injury is frequently irreparable.

6thly, If we succeed in effecting immediate reunion, much pain, suffering and anxiety, are saved. If only a part of the surfaces adhere, we succeed to a certain extent, and the wound is diminished in size; and if we altogether fail, the parts are equally ready for a different mode of treatment, as when we began to make the attempt.

These appear to me to be cogent reasons for attempting immediate union after every surgical operation, while those of the French in favour of secondary union are futile in the extreme.

and dies, there is no swelling, and the process is not preceded by increased redness, heat, or pain; but when mortification follows inflammation, whether induced by a constitutional or a local cause, as after a compound fracture or luxation, there is always great pain, heat, redness, swelling, and violent arterial action. By the violence of the action the structure is destroyed, vesications appear, the part becomes dead and putrid, the skin cracks, and the dead are separated from the living parts by a process of the animal economy involving two distinct terminations of inflammation, adhesion, and ulceration. To this there succeed to a certain extent, granulation, and, finally, cicatrization, which terminates the process; but not unfrequently the patient dies before the separation takes place. That species of the disease which is the immediate offspring of inflammation, is what we have at present to consider.

Mortification has been divided into two varieties, termed gangrene and sphacelus. Gangrene, or the partial death of a part, is the first stage of the disease; and sphacelus is the second stage, or the complete death of a part, the most perfect state of mortification.

This termination is more apt to occur in the skin, cellular substance, stomach and intestines, than in other kinds of structure; and it more frequently follows erysipelas than phlegmon. When an inflamed part is about to pass into the state of mortification, the patient generally complains of a burning heat in it, of increased pain; the part affected assumes a dark red colour, the cuticle rises in vesications; and the change of colour proceeds from a lighter to a darker shade, till the natural colour, heat and feeling are entirely gone. When the mortification is extensive, and more especially when it affects any vital part, the pulse becomes feeble and typhoid; a low muttering delirium supervenes, sometimes subsultus tendinum, and not unfrequently hickup, particularly if the mortification is extensive, or affects internal parts, as the stomach and intestines. But this constitutional affection seems principally to arise from absorption, for after the mortification has subsisted for a time, the fœtid matter is absorbed, the system becomes poisoned, a typhoid fever succeeds, all the powers of life sink, and the patient is inevitably lost. In the production of every disease, there are various predisposing causes, and this is also the case with mortification; for it is observed that patients, whose constitutions are under the influence of certain agents, are particularly subject to this termination: thus living much on animal and high-seasoned food, habitual intemperance, especially the drinking of spirituous liquors, and old age, particularly predispose to this disease. It is also observed, that the inflammation excited by the injection of various stimulating fluids into the cellular substance, from exciting a high degree of inflammatory action, have a great tendency to induce gangrene;

thus, when the urine escapes into the cellular substance of the scrotum from the rupture or ulceration of the urethra, gangrene more frequently occurs than any other termination of inflammation; and when the ~~urine~~ wine gets into the scrotum in attempting to inject a hydrocele, sloughing generally follows. I once saw a man die in consequence of the wine being injected into the cellular substance; there succeeded to this gangrene, and the typhoid fever which accompanies it, and he died before any sloughing took place.

When a part becomes completely mortified, and the progress of the disease is stopped, an action or process succeeds, by which the dead are separated from the living parts. This process Mr Hunter denominates the ulcerative absorption, and in consequence of it, sloughs are thrown off from ulcers, bones exfoliate, frost-bit parts are extruded from the sound, and dead portions of animal matter are separated from the living body.

When a gangrenous or dead part is about to separate from a living part there first appears upon the living part at its junction with the dead, a red line, which marks the adhesive inflammation; then a crack or slight ulceration follows, which indicates the ulcerative inflammation or absorption; then suppuration succeeds; then an effusion of coagulable lymph, which shortly after assumes the form of granulations, leaving an ulcerated surface. The whole of this process is always the effect of irritation, induced by the presence of the mortified or dead part, and were it not preceded by the adhesive inflammation, there would, to the separation of the slough, succeed a bleeding; but this adhesive inflammation closes up the blood-vessels, and prevents the occurrence of hemorhage upon the separation of the gangrened parts.* This ulcerative inflammation, by which the dead are separated from the living parts, may be excited by the red oxide of mercury; by the fumes of nitrous acid; by carbonic acid gas; by turpentines and warm dressings; or by any other irritating substance: hence these applications are frequently used to accelerate the separation of the sloughs in superficial mortification. Independently of the extremities of the vessels being sealed up by the adhesive inflammation, the blood coagulates in the larger trunks, both of the arteries and the veins. This coagulation extends for some length above the mortified part, and seems, in some measure, to arise from the vessels not possessing so strongly as they do in health, that principle of life by which they circulate the blood, and maintain its fluidity.

---

* In consequence of this adhesion, we frequently find, upon amputating near the line of separation in a gangrened limb, that no bleeding follows upon dividing the principal vessels; of course there is no necessity for applying ligatures. After amputation of the fore-arm above the wrist, in a case of gangrene of the hand, in consequence of a gun-shot wound, I needed to secure, by ligature, only the radial artery. There was no bleeding either from the interosseous or ulnar artery, although the latter be the principal artery of the hand.

A question was for a long time agitated respecting the propriety of amputation in mortification, and its merits have been amply discussed by surgical writers. Mortification may arise either from a constitutional, or from a local cause. The spreading mortification, or that which follows inflammation from a constitutional cause, is always connected with a constitutional diathesis; and therefore amputation is inadmissible, as the mortification would immediately appear on the face of the stump. When it follows external injury, it is generally local; but still there may be such a degree of inflammation as to render amputation dangerous, and the system may be poisoned from the absorption of the dead animal matter. Our two chief reasons then, for not having recourse to amputation in these circumstances, are the high arterial action in the limb, and the poisoned state of the system; but mortification frequently follows a local injury without being preceded by high inflammation, as is sometimes the case in lacerated and gunshot wounds. It is to the two former of these cases, viz. to mortification arising from a constitutional cause, and to mortification following external injury from high inflammation, that the reasonings of Sharp and Pott apply for interdicting amputation, a practice which has now passed into a sort of aphorism; and it is to that species of local gangrene, not preceded by high inflammation, that the directions of the French military surgeon Larrey are adapted. This writer has again revived the discussion of this subject, which we shall particularly take notice of, when treating of gunshot wounds.

CONSTITUTIONAL TREATMENT.—The cure of mortification naturally resolves itself into the constitutional treatment, and the local treatment. By attending to the progress of the disease from its incipient state to its final completion, we shall frequently be able to observe two distinct stages; the knowledge of which is of great utility, as it not only enables us to arrange our ideas, but regulates the whole of our practice. The first stage, or the incipient state of gangrene, is most commonly a state of morbidly increased action; the pulse is full, and strong, the febrile symptoms continue unabated, and the mortification seems to take place from the violence of the inflammatory action. This stage most frequently presents itself when mortification follows inflammation in consequence of external injury. The second stage is a state of extreme debility, the pulse sinks, the powers of life are languid, and all the actions of the system are brought low. Now it is evident, that our practice must differ, as the one or the other of these stages prevails. In the stage of increased action, we bleed, purge, and enjoin the strictest antiphlogistic regimen, as we do in acute inflammation, especially if the patient be young, and the inflammatory fever high. In the stage where the symptomatic fever is gone, where the pulse is sunk, or the fever of the typhoid kind, we pursue an opposite plan, and prescribe strong soups, wine, and medicines of the class of tonics or stimulants. Our constitutional treatment must, therefore, be regulated according as either of these stages prevails. In the stage of increased action, or where the inflammatory fever is violent, we bleed, and repeat it if necessary. We keep up the action of the bowels by brisk cathartics; interdict all animal food and strong liquors; give acidulated drinks, and keep the patient low and cool. But if called to a patient when the symptomatic inflammatory fever is gone, or when the stage of debility is present, we pursue an opposite plan, which consists in exhibiting bark and wine, strong soups, opium, and other stimulants. Bark was at one time considered a specific in mortification, as mercury is in the venereal disease; but its high reputation has been for some years past on the decline. Mr Sharp had no faith in bark for the cure of mortification. Mr Pott says, that in mortification of the feet and toes it is inefficacious; and in every case where I have tried it, and my practice at one time was pretty extensive, I never found it of the smallest utility. It is always exhibited in combination with port wine. As bark belongs to the class of tonics, we must remember, that it cannot be given with safety during the inflammatory symptoms, and is only adapted for the completely-formed state of the disease. Opium is another medicine which has been much recommended of late years. It was much used by Mr Pott in gangrene of the feet and toes. It is one of the best medicines, particularly in the advanced stages of mortification; and it should always be exhibited in small doses frequently repeated. Bark, port wine, and opium, have been the constitutional remedies most generally employed in the cure of mortification; but the whole class of stimulants may be occasionally resorted to with more or less advantage.

Local Treatment.—The best local applications during the stage of increased action or high inflammation, are warm emollient poultices, and warm fomentations. The poultices may be made of bread and milk, or of oatmeal and the powder of linseed boiled in water, or the yeast, the turnip, or carrot poultice, may be employed. They should be applied as hot as the patient can easily bear, and renewed every three or four hours. At each renewal of the poultice, the gangrened and adjacent inflamed parts should be well fomented with flannels, wrung out of a decoction of poppy-heads, and henbane or hemlock leaves, to which a little opium may be added.

If the gangrene has passed into the second stage, and all inflammation gone, it will be advisable to apply stimulant remedies to excite the ulcerative inflammation, by which the dead are separated from the living parts, as cloths dipped in camphorated spirit of wine, turpentines, and resins, in the form of hot dressings, tincture of myrrh and bark, warm vinegar, the red oxide of mercury, carbonic acid gas, the fumes of nitrous acid, &c.

When the gangrene is situated in the extremities, and the farther progress of the disease is stopped, we either wait for the natural separation, treating the ulcerated surface like a common sore, or we perform amputation at a higher point in the limb. In general, it will be better to amputate as soon as the gangrene has stopped, and the line of separation is fairly marked; because, in this case, we have it in our power to remove the limb at the place most convenient for making a serviceable stump. We heal the wound by the first intention, by which we effect a cure in a far shorter time than we could cicatrize a large ulcerated surface; and we always procure a stump, covered by a cushion of strong integuments, including the true skin; whereas, after natural separation, the stump is only covered with a tender cuticle, which is prone to ulcerate upon the slightest accident.

SCIRRHUS.

Scirrhus is the fifth termination of inflammation. It occurs only in glands or parts of a glandular structure, and is a hard, firm, irregular tumor, without pain or change of colour in the skin, and with a loss of the function of the part affected. Several writers have denied this termination to inflammation, alleging that scirrhus frequently occurs without being preceded by this action, as that species of scirrhus which precedes cancer; but as well might they deny that mortification was a termination of inflammation, since mortification frequently occurs without being preceded by inflammatory action. I very much doubt whether even that scirrhus which appears spontaneously, and frequently terminates in cancer, is not preceded by inflammation, although not very apparent. We often see a destruction of structure, consequent scirrhosity, and loss of function, following inflammation of the liver, pancreas, mamma and testicle. We therefore must consider scirrhus as a legitimate termination of inflammation, although this termination sometimes does not immediately follow the inflammation, so as to constitute one continued chain of operations; but a period of greater or less duration frequently intervenes betwixt the apparent termination of the inflammation, and the state of scirrhus. I lately had under my care a case, where both testicles, in consequence of inflammation, had become completely scirrhous, and their function so entirely gone, that there was no secretion of semen. The patient was a married man, and, in coition, never had any emission. I am inclined to believe that scirrhus frequently occurs from repelling the inflammation in glandular parts by cold applications. In the inflammation of this structure, I should, therefore, prefer warm fomentations, warm saturnine lotions, and warm applications of all kinds to cold, especially if in a state of active inflammation. When a part has passed into the state of scirrhus, we are advised to attempt to resolve it by local blood-letting, mercury, cicuta, purging, &c.; but there is no danger in the scirrhus if it does not pass into the state of cancer, and if the loss of the function does not derange the animal economy, which happens in scirrhus of the liver, but not in scirrhus of the mamma or testicle. Scirrhosity of these external organs may continue for life without affecting the general health. All that follows is only the loss of the office of the part.

EFFUSION.

Effusion is the sixth termination of inflammation which we enumerated. It was formerly remarked, that the structure most liable to this termination was serous membrane; hence we frequently find local dropsy arising from inflammation of the serous membranes lining the different cavities. General dropsy is always a disease of extreme relaxation and debility, and dropsy of the great cavities frequently arises from the same cause, although it sometimes occurs as a consequence of inflammation; but dropsies of the lesser cavities, as those of the tunica vaginalis, the bursæ musosæ, or the capsules of joints, may frequently be traced to inflammation following a local injury. We have also a good illustration of inflammatory action terminating in effusion in acute hydrocephalus, for this disease is nothing but effusion in consequence of intense arterial action. It consists of two stages: In the first stage, there is shooting pain in the head, flushed countenance, inflamed eye, unable to bear the light, quick and full pulse, beating from 120 to 130 in a minute, great thirst and hot skin, indicating inflammation of the brain. In the second stage, the shooting pain in the head ceases, the countenance turns pale, the pupil is dilated, the patient is attacked with vomiting, the bowels become costive from paralysis, and the pulse becomes slow, beating 60 in a minute, indicating effusion, dropsy, or compression. We frequently find effusion following inflammation of the thorax and lungs. When inflammation of the peritoneum, and cavity of the abdomen occurs, as a consequence of wounds, we find, upon dissection, a great quantity of effused fluid. Hydrocele follows inflammation of the testicle from a blow, and dropsy of the bursæ and joints frequently arises from external injury, followed by inflammation. These facts satisfactorily prove, that effusion is as legitimate a termination of inflammation as suppuration or gangrene.

ULCERATION.

Ulceration, or what Mr Hunter denominates the ulcerative absorption, is the seventh and last termination of inflammation; and here, as in the other terminations, there is a structure where the inflammation is peculiarly apt to terminate in this manner, which is mucous membrane and the skin. Hence inflammation of the schneiderian membrane, the inner surface of the œsophagus, the intestines, the urethra, vagina, and other mucous membranes, frequently ends in ulceration; and we perceive, that when an ulcer begins to become larger, it is always preceded by inflammation; and the quickness of increase is generally proportioned to the violence of the inflammation. Inflammation is always the forerunner of ulceration, which arises from irritation, and is always preceded by the adhesive inflammation, otherwise the vessels would bleed as soon as the ulceration took place; and we see, that where the ulcerative inflammation suddenly occurs, without being preceded by the adhesive, as is sometimes the case in the intestines and in the mouth from the action of mercury, there is frequently a copious bleeding from the vessels not being closed.

The cure of ulceration requires a different treatment, according to a variety of circumstances, whether it is connected with a constitutional, or arises merely from a local cause; whether it depends upon a specific action, as syphilis or scrophula; whether it is merely a process of the animal economy to give exit to the matter of abscess, and according to the period of its duration, whether it is of an old or recent date.

DIVISION

OF

INFLAMMATION.

INFLAMMATION may be arranged in three great divisions. 1st, Healthy Inflammation. 2d, Unhealthy Inflammation; and, 3dly, Specific Inflammation.

1st, By Healthy Inflammation, I understand a morbid accumulation of blood in the red capillary and serous vessels of the part affected with the presence of increased vascular action in the series of arteries immediately leading to the seat of the disease, or extending to the heart and whole arterial system of an animal body, in which there does not exist, or has not previously existed, any local or constitutional disease, to excite or influence that action; but where all the organs are in a healthy state, and all the functions regularly performed. As examples of healthy inflammation, we may enumerate pleuritis, peritonitis, and phlegmon.

2dly, Unhealthy Inflammation, I would define to be the same morbid accumulation of blood in the red capillary and serous vessels of the part affected, with the same increased vascular action in the series of arteries immediately leading to the seat of the disease, or extending to the heart and whole arterial system, occurring in a constitution enfeebled by previous local or constitutional disease, or when such diseased state has evidently excited, influenced, or modified this action, so as to make it assume a particular type. As instances of unhealthy inflammation, we may adduce anthrax or carbuncle, erysipelas, and what has been called chronic inflammation.

3dly, By Specific Inflammation, I mean a morbid accumulation of blood in the red capillary and serous vessels of the part affected, with the presence of increased vascular action, to a greater or less extent in the series of arteries immediately leading to the seat of the disease, ~~or~~ and extending to the heart or whole arterial system, induced either by the introduction of a morbid poison; by a peculiar local or constitutional irritation; or by a depraved state of the system, exciting a specific or peculiar mode of action in the diseased part. As examples of specific inflammation, we may name measles, small-pox, scrophula, venereal, cancer, and fungus hematodes.

CHAP. I.

HEALTHY INFLAMMATION.

We defined healthy inflammation to be "a morbid accumulation of blood in the red capillary and serous vessels of the part affected, with the presence of increased vascular action in the series of arteries immediately leading to the seat of the disease, or extending to the heart and whole arterial system of an animal body, in which there does not exist, or has not previously existed, any local or constitutional disease, to excite or influence that action; but where all the organs are in a healthy state, and all the functions regularly performed." Healthy inflammation most frequently occurs betwixt fifteen and forty years of age; and the only species, which we have to consider, as falling directly under the care of the surgeon, is phlegmonic or external inflammation, having its seat in the skin and subjacent cellular substance.

PHLEGMON.

A Phlegmon has been defined to be "a circumscribed tumor, attended with heat, redness, tension, and a throbbing pain." This definition embraces all the local symptoms of inflammation which we have already enumerated, as redness, heat, pain, and swelling; but it must be remembered that these symptoms possess peculiar characters according to the nature of the inflammation. Thus the redness, heat, pain, and swelling of phlegmon, are essentially different from the redness, heat, pain, and swelling of erysipelas.

In phlegmon, the redness is of a bright colour, not capable of being made to disappear upon pressure, or at least with great difficulty, and only for a moment. The heat is moist, or what Richerand compares to that produced by the vapour of boiling water, the pain is generally in the beginning of a tense, but gradually becomes of a dull heavy throbbing nature, and the swelling is more considerable, and more distinctly marked than in any other species of inflammation; hence in phlegmon the swelling and redness are always circumscribed, strongly marked in the centre, and gradually declining towards the circumference.

When the phlegmonic inflammation is slight, or situated at the remote parts of the system, the disease is entirely local, and there is no constitutional affection; but when it is situated on the head, trunk, or upper part of the extremities, or prevails to any great extent, there follows an increased action in the whole arterial system, and the constitutional supervene on the local symptoms of inflammation, constituting synocha or inflammatory fever, as we have already explained.

TREATMENT OF PHLEGMON.

As phlegmonic inflammation does not depend upon a constitutional affection, but most commonly occurs from local injury, our chief indication should be to attempt resolution; and the rules which we have already laid down in our introductory view of inflammation in general, under the head of Resolution, are all applicable to the treatment of phlegmon, particularly keeping in view our former remark, that when the disease is local, we confine ourselves entirely to local remedies; but that when the increased action has extended to the whole arterial system, our treatment should be general as well as local. Still, as there are some plans of treatment, both local and constitutional, better adapted to one species of inflammation than another, we may briefly remark, that in the treatment of phlegmon, when the disease is entirely local, and the symptoms not very violent, all that is requisite is to moderate or subdue the action in the vessels leading to the inflamed part; and we attempt this by means of cold applications, the best of which are cold solutions of opium and the preparations of lead. The application of these remedies ought to be made to a much greater extent of surface than is generally done; for if our reasoning on the proximate cause of inflammation be correct, it is manifest, that in the acute stages of that disease, the remedies should rather be applied to the vessels immediately leading to the inflamed part, than to the dilated vessels in the immediate seat of the disease, because it is in the former of these vessels that the increased action is situated. It is upon this principle that bathing the forehead and temples frequently with cold water gives so much relief in ophthalmia, or applying cloths dipped in cold water to the throat, arrests the progress of cynanche tonsillaris, or cures the disease. In the milder species of phlegmon, while we keep the affected parts continually covered with cloths dipped in cold solutions of opium or satarnine solutions, we exhibit a brisk saline cathartic, and enjoin a low diet. If the local symptoms be violent, we precede the use of the cold solutions by the application of eight or ten leeches, the number being proportioned to the severity of the symptoms and extent of the disease, and repeated according to circumstances. If the disease extends to the constitution, we have recourse to general bloodletting, and repeat it according to the degree of fever, the strength of the patient, and the violence of the disease, agreeably to the directions laid down under the head of resolution, while we purge briskly, and pursue the strictest antiphlogistic regimen. If the disease has subsisted for some time, and the pain is violent, particularly that of tension, it will be advisable to use the remedies hot instead of cold, assisted by warm fomentations, to promote that effusion from the vessels in the immediate seat of the disease, by which we observed that the action of the vessels leading to the inflamed part is either moderated or subdued. If this does not effect resolution, it will promote suppuration, and save the structure of the part, which, from the violence of the action, is in danger of falling into gangrene.

As phlegmon, in surgical practice, generally presents itself in consequence of local injury, whatever treatment is adopted, the first object of the practitioner should be to remove any palpable exciting cause, as foreign bodies sticking in the flesh.

If the plan of treatment which we have now recommended be adopted early, and pursued with attention, we shall generally be enabled to effect resolution; but if this cannot be done, there most commonly follows a formation of pus, as phlegmon has a natural tendency to terminate in suppuration, forming what has been called an Acute Abscess.*

---

* Although we have defined phlegmon to be a circumscribed tumor, attended with redness, heat, and a throbbing pain, and

Acute Abscess.

When pus is collected in a sac or cyst, formed in consequence of the adhesive inflammation, this collection of matter is termed an abscess. The cellular substance is the common seat of abscess, but pus may be secreted into a natural cavity, as into the thorax, the abdomen, or the capsule of a joint; from the surface of the skin, as in burns or blisters; from mucous membranes, as the urethra, vagina, and inner surface of the trachea, and in general, from every structure of the animal body; and all this without ulceration or loss of substance. The sac of an abscess seems at first to be formed by the effusion of coagulating lymph. It then becomes very vascular; is connected by means of vessels to the surrounding cellular substance. From these vessels it may be injected, and is thicker or thinner according to the size of the abscess, and the length of time the inflammation has

---

described it as an external disease, still it must be recollected, that the same species of inflammation attacks many internal parts; and when the inflammation does not originate from, or is not influenced by a disordered state of the system, it is always of this nature: Thus Ophthalmia, Cynanche Tonsillaris, Pleuritis, Peritonitis, Hepatitis, Nephritis, and many other inflammatory diseases, which fall under the care of the physician, are pure instances of phlegmonic or healthy inflammation.

subsisted. These sacs or cysts are as completely organized as the natural structures of the body. They are endowed with blood-vessels, absorbents, and nerves, and they are both secreting and absorbing surfaces, which is proved by the rapidity with which they are again filled after being emptied, by the discharge being increased on the application of stimuli, as the access of the air, the introduction of tents, the contact of the red oxide of mercury, and other irritating substances, and by collections of matter frequently disappearing without being opened, which can only take place from absorption.

Pus has a tendency to work its way to the surface, and this takes place by what Mr Hunter terms the ulcerative absorption. He justly remarks, that " inflammation, wherever situated, is always more violent on that side of the point of inflammation next to the external surface." It is on this external surface of the abscess, that the absorption and ulceration take place, by which the matter is discharged; and it is a singular circumstance, that when the matter reaches the surface, the cuticle resists and prevents its escape; the cuticle does not ulcerate, but gives way by distension; hence we frequently see it rising like a cream-coloured pustule, and preventing the escape of the matter after the cutis has ulcerated. We therefore touch it with a lancet, or simply pinch or tear it with the finger nail, and allow the matter to escape.

Abscesses have been divided into acute and chronic; and it has been remarked, that the quicker an abscess is formed the quicker it heals; hence, comparatively speaking, acute abscesses are attended with little danger, unless situated in vital parts, whereas chronic abscesses are highly dangerous; and it is this species of the disease which has engaged the chief attention of surgical writers, concerning the treatment of which there has been a diversity of opinion, and which are certainly the most difficult to manage.

Treatment of Acute Abscess.

There are cases in which acute abscesses should be allowed to burst of themselves, and cases in which they should be opened by art. Mr Hunter was of opinion, that, in general, abscesses should be allowed to open of themselves, but when they burst of themselves, they have frequently less disposition to heal than when opened by art, because, by distension, the structure of the skin is destroyed.

Practitioners are in general agreed with regard to those acute abscesses which should be allowed to burst spontaneously, and those which should be opened by art; thus, when an abscess is situated upon the thorax or abdomen, or over a joint, it should always be opened by art, for although it is a general law for all collections of matter to seek the surface, there is a possibility of its bursting inwardly; and, indeed, there are cases on record, where the matter has burst into the thorax and abdomen before it reached the skin, although I believe this circumstance is more likely to happen in chronic than acute abscess. When an abscess is deep seated, as among the muscles under the fascia, the contents should also be discharged by art, because the matter sometimes pursues a long tract before it reaches the skin; dissecting the muscles, spoiling the bone, or bursting into some internal cavity. But when the abscess is situated in the cellular substance, and superficially, it seems most advisable to allow it to burst of its own accord; and when we wish to promote the suppuration, we should have recourse to warm fomentations, to warm emollient poultices, renewed every four or five hours, and rendered stimulating by the addition of onions, camphorated oil, or camphor rubbed with palm-oil. This should be the treatment when abscess is allowed to burst of itself; for the ulcerative absorption is rapid in proportion to the inflammation; and it is particularly required in suppurations of the groin, angle of the jaw, mamma, and other species of glandular abscess, which are always long in suppurating.

When we open an acute abscess by art, we use a common lancet. We enter it at the most prominent point where the skin is thinnest, and make an opening sufficiently large to evacuate the matter. Into this opening, we insert a piece of oiled lint to prevent it from closing. We renew the warm poultices and fomentations, and continue their use till the basin of the abscess becomes completely soft. At the end of two or three days, we withdraw the piece of lint from the wound; and when all hardness is gone, and the sac begins to granulate and fill up, we cover it with dry lint; a compress and roller increasing the compression daily, till the basin of the abscess is completely filled up, which is done partly by granulation, and partly by the approximation of its opposite sides. While we adopt this local treatment, we support the patient's strength by a generous diet; bark, wine, country-air, and other tonics; as the discharge from all abscesses, both acute and chronic, like the other secretions, is increased or diminished according to the state of the system.

CHAP. II.

UNHEALTHY INFLAMMATION.

WE defined unhealthy inflammation to be "a morbid accumulation of blood in the red capillary and serous vessels of the part affected with an increased vascular action in the series of arteries immediately leading to the seat of the disease, or extending to the heart and whole arterial system, occurring in a constitution enfeebled by previous local or constitutional disease, or where such diseased state has evidently excited, influenced or modified this action, so as to make it assume a particular type." The inflammatory diseases which fall under this head, are; 1st, Furunculus or Boil. 2d, Anthrax or Carbuncle. 3d, Erysipelas or Rose; and, 4th, Chronic Inflammation.

SECTION I.

FURUNCULUS OR BOIL.

The Furunculus or Boil is a firm, circumscribed, and pointed tumor, attended with redness, heat and pain. The redness is of a dark or bluish colour round the base, and terminating in a central whitish or livid point. The heat is scalding like that of boiling water; the pain is throbbing, and the swelling firm and hard.

The tumor is situated in the skin and cellular substance, does not become soft by completely terminating in suppuration; but the cellular substance gangrenes early, and forms a whitish core or slough; and from the central white or livid spot there is discharged a quantity of a thick pus or bloody matter, when this slough becomes very conspicuous, filling up the centre of the tumor. After this slough is discharged, there remains a circumscribed hard base, with a deep central cavity, from which there is discharged through one or more openings a bloody matter.

A boil is generally about the size of a pigeon's egg; sometimes there is but one, sometimes many, and frequently several appear in succession. When there is but one, there is no constitutional affection, unless the local symptoms are violent and the boil large; but where there are several, febrile irritation always exists to a greater or less extent.

TREATMENT OF FURUNCULUS.

As boil belongs to the class of unhealthy inflammation, and is not a local disease, we should never attempt resolution, but in every case endeavour to bring it to suppuration. For this purpose, we employ warm fomentations and warm emollient poultices; or if the boil is situated where the poultice cannot be kept conveniently applied, we cover it with a piece of leather, thickly spread with diachylon or gum-plaster. When the tumor becomes a little soft in the centre, we make a free opening into it with a lancet or the point of a bistory, continue the poultices and fomentations, and extract as early as possible the central slough or core. If the base of the tumor remains hard, and its basin discharges a bloody pus, we introduce into it a piece of lint, besmeared with basilicon, sprinkled with a little of the red oxide of mercury, or combine the mercury with the basilicon in the form of ointment. While we do this, we continue the fomentations and poultices; and after the base has become soft, we employ simple superficial dressings, a compress and bandage. In combination with the local treatment, we increase the actions of the gastric system by means of gentle laxatives, and pursue the antiphlogistic regimen.

SECTION II.

ANTHRAX OR CARBUNCLE.

THE Carbuncle is a more aggravated species of Boil. There is the same hard and firm swelling, livid redness, burning pain, central livid spot, and tendency to gangrene; but the symptoms are all more violent in degree, the swelling is more extensive, the pain particularly violent, hot, and burning, the livid pustule in the centre of the tumor appears early, extends rapidly, discharges by several small openings a bloody pus or ichorous matter; the gangrene has a tendency to spread, and this central slough comes out, leaving a deep ulcerous basin.

Carbuncle is generally situated on the neck, back, and loins, where the cellular substance is thick and gross. There is always at first great pain and great constitutional irritation, which abate as the tumor suppurates and the slough separates; but sometimes when it falls into gangrene, the pulse becomes feeble, and of the typhoid type. There is great debility, sunk countenance, a general depression of the vital powers, and not unfrequently hickup, although these symptoms are rather characteristic of the pestilential or contagious anthrax, than of that which occurs under other circumstances.

TREATMENT OF CARBUNCLE.

In the treatment of Carbuncle, we never think of repelling the inflammation. Our great object is to prevent the tumor from falling into gangrene, or rather to keep the gangrene from spreading, and to procure a speedy separation of the slough. For this purpose, as soon as the centre becomes a little soft, we make a free transverse incision with the scalpel or bistoury. This takes off the tension, opens up the tumor, permits the bloody ichor to escape, and enables us more effectually to apply our fomentations, poultices, or other medicines, to promote the separation of the slough. One incision is generally sufficient; but if necessary, we repeat it; and in this case it is advisable to make it in a transverse direction, so as to form a crucial incision.* We use fomentations and poultices, as in the treatment of the boil; but as the pain and burning heat are much more violent in carbuncle, we add to the fomentations poppy-heads, henbane-leaves, and other narcotics, or employ warm solutions of opium. When the hardness and pain have abated, we may sprinkle the slough with the red oxide of mercury, or employ resinous or turpentine dressings. When the slough is separated and the ulcer clean, we treat it as the common boil, with simple dressings.

---

* At the Hôtel Dieu, in the treatment of carbuncle, they always make early and free incisions. M. Dupuytren shewed me a case of extensive carbuncle situated on the back. He told me, that unless they made *debridement* or a free incision, gangrene always succeeded; and in this case I observed that several deep incisions had been made.

With regard to the constitutional treatment; in the early stage, when the febrile irritation is great, we derive a marked advantage from the repeated exhibition of gentle saline cathartics; and as carbuncle is frequently connected with the gastric system, it may be advisable first to exhibit an emetic; we also give acidulated drinks. After the primæ viæ are well cleared out, and the inflammatory irritation has subsided, we exhibit bark, wine and opium, with strong soups, nourishing diet, and whatever is found useful in gangrene.

SECTION III.

ERYSIPELAS OR ROSE.

Erysipelas is the most common example of unhealthy inflammation. Although it possesses all the marked characters of inflammatory action, such as redness, increased heat, pain, and swelling, yet these symptoms differ in a remarkable degree from those of phlegmonic or healthy inflammation, and are decidedly influenced by the state of the system. The seat of erysipelas is rather in the skin than cellular substance, although in the progress of a violent attack of this disease, more especially when combined with phlegmonic inflammation, which is sometimes the case, the erysipelas extends to the latter structure. It is generally preceded by constitutional symptoms, but sometimes it occurs in consequence of external injury. In the latter case, it may either arise from the state of the constitution, or from the diseased action of the part, or from both. Erysipelas often follows compound fractures, and other wounds in habits diseased by intemperance, or otherwise. It is peculiarly apt to succeed to punctured wounds of the head, from the peculiarity of its integuments, and frequently occurs in anasarca of the lower limbs, from the skin inflaming from tension, or in consequence of the punctures of the lancet, in giving exit to the accumulated fluid.

In erysipelas, the redness is of a clear shining colour, inclining a little to yellow, not circumscribed, but diffused, disappearing upon pressure, but immediately returning when the pressure is removed; the heat is acrid, conveying to the touch a burning parched sensation. The pain is at first tensive, then hot and itching; and when the inflammation is completely developed, tensive and burning, and the swelling is diffused, and so indistinctly marked, that it may be said that there is more of tension than swelling. Erysipelas possesses this character, like the inflammations of rheumatism and gout, that it often shifts its seat, attacking several parts in succession; or sometimes, after fixing on a part, before it fully developes itself, it suddenly leaves it and reappears in some more distant situation.

An attack of erysipelas is generally preceded by constitutional symptoms, and most commonly depends upon some derangement in the gastric system. For two or three days before its appearance, there is an uneasiness in the region of the stomach, accompanied by nausea, bitter taste in the mouth, drowsiness, headach, and slight febrile irritation. The erysipelas may appear on any part of the skin. It most commonly attacks the face, and not unfrequently the lower limbs. When it appears on the face, the disease is more dangerous than in any other part, from its vicinity to the brain, to which the inflammation not unfrequently extends.

Erysipelas has various terminations. It may terminate in resolution; and when it does so, it leaves the skin of a pale yellow, followed by a desquamation of the cuticle. It sometimes ends in the formation of matter in the subjacent cellular substance; but in such cases there is always a combination of this disease with phlegmonic inflammation: not unfrequently small serous vesicles appear, which, bursting, terminate in ulceration; and, lastly, erysipelas has a great tendency to terminate in gangrene.

TREATMENT OF ERYSIPELAS.

In the treatment of erysipelas, the best practitioners, continental as well as British, have almost exclusively employed constitutional remedies, considering this inflammation as depending upon a disordered state of the system. They have attempted the cure more by internal than external remedies, only applying to the inflamed part, dry farinaceous powders, or exposing it to a stream of cool air, while they administered vomits, purges, diaphoretics, and occasionally employed general bloodletting, especially when the erysipelas was situated in the face.

The inflammation being connected with a disordered state of the system, we ought undoubtedly never to attempt to repel it by saturnine lotions, or other cold applications, nor can we venture to employ local bloodletting by means of leeches, as the bites of these animals are very apt to terminate in gangrene. I have always found the best local treatment to consist in repeatedly fomenting with warm solutions of opium. There is nothing so effectual as warm opiate fomentations in lessening the acrid burning heat, taking off the tension, relieving the pain, moderating the action, and thus subduing the inflammation. The inflamed part should be fomented with a strong opiate fomentation four times a-day, half an hour each time, covering it in the interval with ceruss, the impure oxide of zinc, or the impure carbonate of zinc, finely powdered, dusted through a piece of muslin, or with hair-powder. * We attend particularly to the constitution; and as the disease most generally depends on derangement

---

* When the tension is great, Burserius recommends incisions in the inflamed part, to prevent gangrene. Serous effusion is at the same time discharged. Free incisions in erysipelas phlegmonoides have also been recommended by some surgeons in this country, particularly by Dr Hutchieson, surgeon of the Naval Hospital at Deal. Dr Hutchieson makes longitudinal incisions of an inch in length. These are carried through the integuments down to the muscles early in the disease, before any secretions take place; they evacuate a quantity of blood, take off tension, and give exit to any secretion which may occur. I have had no experience in these incisions, having seldom failed to take off the tension, and subdue the inflammation by the warm opiate fomentations. I must, therefore, refer the reader to Dr Hutchieson's paper in the 5th volume of the Medico-Chirurgical Transactions.

Some French practitioners employ blisters, directly applied to the inflamed part, which they describe as powerful in effecting resolution, or inducing a gentle suppuration. Blisters are much employed for this purpose at Hôtel Dieu; although I believe Dupuytren rather employs them when the erysipelas is combined with phlegmonic inflammation, that is, when the inflammation extends to the subjacent cellular substance, than when it is purely erysipelatous.

in the gastric system, we first exhibit an emetic, keep the bowels very open by saline cathartics, and keep up a gentle diaphoresis by means of antimonials. If the pulse is full and quick, and the febrile irritation great, we bleed, although this is seldom necessary, unless the inflammation be situated about the head, when it frequently becomes highly proper. If the disease issues in gangrene, we must adapt our remedies to that termination of inflammation.

SECTION IV.

CHRONIC INFLAMMATION.

Chronic Inflammation, as opposed to acute, must be arranged under the head of unhealthy inflammation, because it is always connected with an enfeebled or diseased state of the system. It occurs in the decline of life, and in early life in feeble and relaxed habits where the vascular actions are languidly performed, or where there is a general debility of one system of vessels, as in scrophula. In chronic inflammation, it is long before the local symptoms are distinctly marked. There is little pain, no perceptible heat, no redness or change of colour in the skin. The most marked symptom is the swelling, which is hard, circumscribed, and without pain. In the progress of the disease, the local symptoms of inflammation are more completely developed, and in the latter stages become much more conspicuous, although the action never proceeds with so great rapidity as in acute inflammation. We frequently see chronic inflammation presenting itself as a consequence of external injury, and terminating in abscess; but I apprehend, that although we are sometimes able to trace it to local injury, still such an inflammation only takes place in an unhealthy state of the system. This inflammation may attack a variety of structures; but when it appears in the cellular substance, it generally terminates in suppuration, and the matter is always thin, of a greenish colour, like whey, and generally mixed with curdly flakes like the contents of scrophulous abscesses In chronic inflammation, from the feebleness of the action, good pus is not secreted; hence it is always thin. A due proportion of active inflammation is requisite to form good pus; too much inflammation disturbs the secretion, and makes the pus bloody; by too little inflammation or defect of action, it is less perfectly formed, and therefore thin and serous.

The symptoms of chronic inflammation are so little apparent, that it generally terminates in the formation of matter before we are aware of its existence; however, if we are led to suspect its presence from swelling, local pain, or general constitutional derangement, the only way I know of arresting its progress is to throw the action on the more superficial vessels, by inflaming the skin by means of rubefacients or blisters; or if the inflammation be deep seated, by the insertion of a caustic issue immediately over the seat of the disease, while we attempt to invigorate the constitution by cold bathing, bark, iron, nourishing diet, country air, and gentle exercise; although from the obscurity of the symptoms in its early stage, the disease generally makes so much progress as to terminate in abscess before we are aware of its existence, more especially when deep seated.

Chronic Abscess. *

Chronic abscess is the consequence of chronic inflammation. It is more dangerous than acute abscess, and may occur in any part of the system, but the most remarkable species is lumbar abscess. Chronic abscesses are long in forming; they are generally scrophulous, containing thin serum, with curdly flakes. Like the other forms of scrophula, they occur oftener in young subjects than after the meridian of life. They have no tendency to point, are accompanied with no pain, and no change of colour of the skin. Sometimes they disappear spontaneously, and sometimes in consequence of emetics. In chronic abscess, a great length of time always intervenes from the appearance of the tumor till the integuments ulcerate; whereas in abscess from active inflammation, the ulceration always occurs soon. The ulceration seems to follow with a rapidity proportioned to the activity of the inflammation. The formation of acute abscess, when the inflammation is extensive, is always attended with rigours, but in the formation of chronic abscess, neither these nor any other constitutional symptoms occur till the abscess is opened.

---

* The French writers divide Chronic Abscess into two species. When the matter presents itself in the seat of the inflammation, it is called *Abscès Froid*, or Cold Abscess; when it presents itself at some distance from where the inflammation existed, by which it was originally formed, as in lumbar abscess, *Abcès par Congestion*, or Abcess by Congestion. This seems to me to be a useless distinction, as attended with no practical advantage, the treatment in both cases being the same, unless we consider it as a distinction, that the latter is far more dangerous than the former; indeed, they consider lumbar abscess as always accompanied by caries of the vertebrae, and inevitably fatal.

In chronic abscess, as there is always little inflammation, the adhesive process (which forms the sac and always precedes the formation of the matter), has not so completely and effectually taken place as to form a distinct circumscribed sac to contain the matter; hence it in some measure passes from one cell to another. The abscess is therefore always large, and often appears on the surface far from the place of its formation, as in lumbar abscess, and in abscess of the hip-joint.

Treatment of Chronic Abscess.

There has been a considerable difference of opinion with regard to the method of opening chronic abscesses, or indeed whether they should be opened at all, or allowed to burst of themselves. Some surgeons observing that the constitutional symptoms never appear till they are opened, are against opening them, and recommend that the process should be left to nature; but if we do not open chronic abscesses, but allow them to burst of their own accord, they generally prove fatal; as before this event takes place they have attained an immense size, there is a big sac, the opening is large, the sac inflames, the irritation is great, the secretion profuse, and the disease commonly terminates in incurable hectic.

The older surgeons were accustomed to open chronic abscesses either by caustic or incision. The opening which they made was large, the sac inflamed, the discharge was increased and became acrid, the patient was attacked with hectic fever, and if the abscess was large he generally died. To this practice succeeded that of the seton, which was chiefly recommended by the Edinburgh school; and, where the abscess is small and situated in the cellular substance, the practice is both safe and efficacious; but where it is deep seated, as lumbar abscess, or abscess of the hip-joint, and where it is large, which is much more frequently the case with chronic than with acute abscess, the same objection lies against the seton as against the caustic and incision.

In all chronic abscesses it should be a rule in surgery to open them early, before they have attained a large size, to make a small opening, and, after discharging the matter, to endeavour to heal them by the first intention; this prevents all irritation, keeps off hectic fever, and considerably lessens or altogether removes the danger. In opening acute abscess the opening should be large; in opening chronic abscess, the opening should be small. Acute abscess heals more quickly the more it is exposed to the air; chronic abscess is, by such exposure, rendered more dangerous. The surgeon should therefore make an opening with a common lancet no larger than what is just sufficient to evacuate the matter. After the matter is evacuated, he should put the lips of the wound neatly in contact, and retain them by black court plaster, compress and bandage, in order to procure adhesion; and to attain this desirable event, the abscess should always be opened where the skin is sound, that is, nearer to the base than to the centre, where it has the greater tendency to inflame and point, and the lancet should always be entered in an oblique direction, that is, run for a little way under the skin before the sac is perforated, by which the external and internal openings are not exactly opposed to each other, or do not correspond. When the matter has again collected, but long before it has attained its former size, the same process should be adopted and repeated till the sac is obliterated.

Lumbar abscess.—As lumbar abscess is one of the most remarkable species of chronic abscess, I shall here offer a few observations on this subject.

In the loins and region of the kidnies, and about the origin of the psoas muscle, there is a great collection of adipose substance, and here there is frequently formed an abscess of a chronic nature, called, from its situation, lumbar or psoas abscess. While the disease is forming, the patient complains of weariedness and uneasiness in the loins, with inability to walk, at least any distance; however, there is in general so little pain, that the disease makes considerable progress, and the abscess even points externally before it is suspected that the patient labours under so fatal a complaint. After the matter has formed in the loins it passes downwards, and presents at different points; sometimes following the course of the psoas muscle, it points under Poupart's ligament in the groin; sometimes it descends under the fascia of the thigh, half way to the knee; sometimes it appears above Poupart's ligament on the lower and anterior part of the abdomen; and not unfrequently it passes through the sacroschiatic notch, and assumes the form of an abscess in the neighbourhood of the rectum.

When the matter points in the immediate neighbourhood of the anus, and is unattended with inflammation of the skin, this circumstance will shew that the abscess has not originally formed there, at least not in consequence of acute inflammation; and when it presents at the groin, if the surgeon is commonly attentive, there is little danger of confounding it with any other disease, as it may be sufficiently characterized by the fluctuation, by the want of colour in the skin, by the impulse given to the tumor in coughing, by the absence of pain, by its being firm and tense in the erect posture, and flatter, softer, and looser in the horizontal, and by its appearance being preceded by uneasiness in the loins; in short, by the history of the case, which should on all occasions be minutely attended to in the discrimination of disease. The only disease we can be in danger of confounding with lumbar abscess, is crural hernia; but hernia generally arises after some sudden exertion, is smaller, rises more directly up, is accompanied by affection of the bowels, and can be returned into the abdomen by pressure in the horizontal posture, unless strangulated; and if this were the case, the pain, sickness, vomiting, obstipation of the bowels, and general distress, would at once declare its nature. When the tumor presents at the groin, we must recollect that the matter is always under the general fascia of the thigh.

The matter of lumbar abscess, like that of other chronic abscesses, is contained in a cyst formed in the cellular substance; sometimes the vertebræ are carious, but very frequently the bone is not affected. As the lumbar, like other species of chronic abscess, becomes daily larger from the increased secretion of pus; and as the skin at last ulcerates, discharging the matter by a large opening, in consequence of which, the sac inflames, great constitutional irritation supervenes, and after a few months, and sometimes weeks, the patient dies hectic; we therefore apply the rule to open all such abscesses early, and with a small orifice. In lumbar abscess, the opening should be no larger than what is just sufficient to allow the exit of the curdly flakes which these scrophulous abscesses contain, mixed with the matter. All that is necessary for effecting this, is a common lancet and a probe. A small opening should be made with the lancet, which will be sufficient to discharge the matter. The lancet should always be entered obliquely, that is, run for a quarter of an inch under the skin before it is plunged into the sac, and the probe should be immediately introduced, that there may be a direct communication, and that the one opening may not slip from the other; but if the opening should be plugged up with any of the curdly flakes which we have mentioned, they must be pushed back by the probe, and after all the matter is evacuated the lips of the wound must be brought together, retained by a piece of black court plaster, and means used to heal it by the first intention. This reduces the abscess to the state in which it was before it was opened, prevents inflammation of the sac and all constitutional irritation; for before lumbar abscess is opened the system is in general not affected, the appetite is good, the patient sleeps well, and the functions are undisturbed. This is for the most part the case, though not always, for sometimes there is great emaciation and debility; but no sooner is the sac of the abscess exposed to the air than it inflames, and the patient is seized with hectic fever. When the wound has healed, the matter again collects and naturally falls to the most depending part, which must be again discharged before the sac becomes much distended, after which it is to be treated in the same manner as at first. By repeating this operation, and never allowing the sac to be much distended; there is some chance of it becoming gradually contracted at its upper part, and in that case, every subsequent opening will produce less irritation till it is finally obliterated. This chance, however, is but slight: it is a very dangerous disease, and the patient generally dies hectic.

This simple way of treating psoas abscess was first recommended by Mr Abernethy, and it is equally applicable to every species of chronic abscess. Mr A. adduces many cases in support of the practice, and were it necessary I might add to the number. He also recommends to attempt the absorption of the abscess by means of blisters and issues applied to the loins for the excitement of counter irritation, by emetics, electricity, &c. but as the matter is more readily and more commonly absorbed after the abscess has been once opened, I think this practice will be more efficacious after the matter has been once or twice discharged.

Hectic Fever.—The most dangerous and most distressing circumstance attendant on chronic abscess is the fever which frequently supervenes. A few days after the opening of lumbar and other chronic abscesses, especially if the sac is large, and the opening extensive, the patient is seized with quick pulse, especially rapid after meals, flushed countenance, hot skin, the heat particularly distressing in the soles of the feet and palms of the hands, loss of appetite, restless nights, morning sweats, and other symptoms of hectic fever. The discharge from the abscess becomes more copious, the strength sinks, and there is great emaciation.

These constitutional symptoms rarely manifest themselves upon the opening of an acute abscess, but commonly follow the opening of chronic abscess. When febrile symptoms appear upon the opening of acute abscess, the fever is generally of the inflammatory kind; whereas the fever attending chronic abscess is always of the hectic type.

The prevailing doctrine ascribes the origin of hectic to the absorption of the pus. This, however, cannot well be the case, because no hectic takes place before the abscess is opened. It never occurs when the abscess disappears spontaneously, even when the absorption is extensive; for there are many cases on record where large abscesses have disappeared, the matter been discharged by urine, and yet no hectic followed.

When the opening is small and the sac not large, there is little or no fever, but when the opening is large and the air admitted, the matter which at first was without smell, now becomes extremely fœtid, the inside of the sac inflames, from the irritation there is an increased secretion, the abscess discharges as much in one hour as it did in four before it inflamed, and this irritation and increased discharge seem to be the cause of the hectic, and not the absorption of the matter. The process of nutrition is disturbed, the increased discharge drains the system, and draws off that coagulating lymph which should be applied to the purposes of nutrition; hence we frequently see hectic fever produced by the irritation and increased discharge which follows the imprudent use of tents and setons, but as soon as they are withdrawn the discharge abates and the hectic ceases.

CHAP. III.

SPECIFIC INFLAMMATION.

We defined Specific Inflammation to be "a morbid accumulation of blood in the red capillary and serous vessels of the part affected, with the presence of increased vascular action, to a greater or less extent, in the series of arteries immediately leading to the seat of the disease, or extending to the heart and whole arterial system, induced either by the introduction of a morbid poison, by a peculiar local or constitutional irritation, or by a depraved state of the system, exciting a specific or peculiar mode of action in the diseased part." The most remarkable inflammations which fall under this class, and which belong to the province of the surgeon, are; 1st, Scrophula. 2d, Venereal. 3d, Cancer; and, 4th, Fungus Hematodes.

SECTION I.

SCROPHULA.

Scrophula is a disease both hereditary and endemic. It affects the whole lymphatic system, vessels as well as glands, but is chiefly conspicuous in the latter, appearing early in life, rarely occurring after puberty; and from the greater laxity of fibre, more incident to the female than the male. Scrophula is the endemic disease of the middle latitudes of the temperate zone, especially where the air is moist, and where there is great vicissitude of climate, and prevails to a great degree in this country. It presents itself in a variety of forms, changing the character of many local diseases and assimilating them with itself. Thus we meet with a variety of local diseases which are easily cured in a sound constitution, difficult of cure in a scrophulous habit.

The habits most commonly affected with scrophula are those of a lax fibre, with light coloured hair, blue eyes, fine skin, thick upper lip, and loose flesh. It may attack various kinds of structure, but is chiefly observed in the bones, joints, and glands. When it is confined to the lymphatic system, the glands most frequently affected are those of the neck and under the jaw, those of the arm-pit and groin, and internally those of the mesentery. The more aggravated states of the disease are characterized by a large head, a hard and tumid belly, thick nose, swelled and chopped upper lip, and moist blear eyes.

Scrophula not unfrequently appears in the subcutaneous lymphatic glands in the extremities, in the form of a soft moveable oval tumor, without pain or change of colour of the skin. The progress of the disease is slow, and the inflammation always of the chronic kind. These tumors remain long dormant; sometimes they disappear spontaneously, but very frequently they assume the form of chronic abscess, terminating in suppuration and ulceration. The skin acquires a dark or purple hue; the tumor becomes soft and pointed. When the skin breaks or is opened with the lancet, there issues a thin serum mixed with a curdly matter of a sour smell. It terminates in an ulceration difficult to heal, and possessing peculiar characters.

These soft oval glandular tumors are forced on to suppuration and ulceration by any occurrence which weakens the general habit. Thus I have seen such tumors situated under the jaw, in the neck, and even in the extremities, remain long dormant, without any disposition to suppuration, till the patient was seized with a fever, which induced such a debility as to make the tumors inflame and suppurate.

Within the tropics, and in very high latitudes, scrophula is unknown. Its chief exciting causes are a cold moist atmosphere, impure air, bad and meagre diet, with want of exercise; and when these are conjoined with a hereditary taint, they operate with irresistible power in its production. When it occurs in children, it is generally combined with acidity in the stomach and bowels, arising from imperfect digestion, in consequence of a deficient secretion of bile and inert action of the whole glandular viscera.

TREATMENT OF SCROPHULA.

As Scrophula is a disease of relaxed solids and delicate fibres, combined with acidity in the stomach and bowels, arising from want of action in the liver and other visceral glands, our chief object in the general treatment is to invigorate the constitution, and raise the vital powers, while we destroy the acidity in the bowels by means of absorbents and alkaline medicines, and increase their action, and that of the chylopoetic viscera, by gentle purgatives. This we effect by placing the patient on a light and nourishing diet, easy of digestion, and containing a large proportion of animal food, combined with a moderate allowance of wine; making him breathe a warm, pure, and dry atmosphere, changing the climate if practicable; and employing cold, and especially sea-bathing. Dry frictions with a coarse cloth, or with the flesh-brush, should also be used evening and morning, and flannel wore next the skin, which, when frequently renewed, acts as a flesh brush, and keeps up the action of the surface. To the use of these measures should be conjoined moderate exercise in the open air, without fatigue. The state of the bowels and visceral secretions must be particularly attended to; the action of the liver is best increased, and the secretion of bile promoted, by small doses of calomel exhibited daily, and occasionally combined with jalap or rhubarb; the acidity destroyed by prepared chalk, lime-water, or the carbonates of potash or soda; the bowels strengthened by the combination of bitters with these absorbents or antacids, such as gentian, columbo, quassia, &c.; and the general system invigorated by tonics, such as cinchona, but more especially by iron, in the form of officinal preparations, or mineral chalybeate waters.

The muriates of lime and barytes, given internally, have been much recommended, and of late years have become very fashionable remedies. I have frequently employed them, but never saw them, however long continued, productive of the least benefit. The muriate of soda, and more lately the aq. potassæ, have been also highly extolled. When the muriate of soda, in the form of sea-water, has been found useful, it has been entirely owing to its purgative quality increasing the action of the chylopoetic viscera; and when the aq. potassæ has proved beneficial, it has probably arisen solely from its antacid powers, and not from any specific virtue this medicine possesses in scrophula. When we therefore employ sea-water, it is merely as a purgative; and when we have recourse to the aq. potassæ, it is only as an antacid; but for this purpose, calomel by itself, or combined with rhubarb or jalap, and the absorbents we have already mentioned, are superior remedies, and should be preferred.

Scrophulous glandular swellings are always less, and sometimes nearly or wholly disappear in the warm weather of summer and autumn, and return again in the winter and spring. When they are indolent, all the local treatment that is requisite is to keep them well covered, to protect them from the inclemency of the weather. For this purpose, we apply a piece of fur or fleecy hosiery. It has been a common practice to blister indolent glandular scrophulous tumors, to rub them with camphorated oil, volatile liniment, camphorated mercurial ointment, and other stimulating liniments, and to employ frictions. Although these swellings, under this treatment, have frequently been discussed, I consider the practice as not without danger, as by exciting the gland, we are very apt to induce inflammation and suppuration. If the tumor begins to inflame, we should endeavour to repress the inflammation by saturnine applications. This may be done either by keeping the tumor covered with a piece of linen kept constantly wet, with a cold solution of the acetate of lead, or (what is perhaps preferable) by fomenting it for twenty minutes or half an hour, three or four times a-day, with a warm saturnine lotion. The inflammation may be also checked by the occasional application of a few leeches. When matter is fully formed, I am of opinion that it should be discharged by making a small opening with a lancet; because, before the tumor ulcerates, so as to discharge the matter spontaneously, the abscess has acquired a large size, the sac becomes very thick, the skin is much distended, its tone is lost, and the matter is apt to be discharged by a larger opening, which leaves an ugly scar. There is a prejudice in favour of allowing scrophulous glandular abscesses to burst of their own accord. It has been generally imagined, that in this case the sore not only heals more easily, but leaves a less ugly mark. This I have not found to be the case. On the contrary, I have observed, that when the gland had completely suppurated, and the basis of the tumor become soft, it both healed more rapidly, and left a more seemly scar when opened with a lancet, than when the integuments were allowed to ulcerate, and the matter to be discharged of its own accord. I have therefore been long in the habit of discharging the contents of such tumors as soon as the suppuration is fully established, and their basis somewhat soft, and I think with manifest advantage. When the swelling appears under the form of chronic abscess, it must be treated according to the rules laid down under that head. If it is a suppurating gland, we may, after discharging the matter, employ poultices and fomentations for a day or two till the hardness is discussed, then simple dressings with compression. If it ulcerates largely, we treat it according to the rules laid down under the title of Scrophulous Ulcer.

There are two leading forms under which scrophula presents itself to the surgeon; viz. white swellings of the joints, and a troublesome ulcer, sometimes irritable and sometimes indolent, always difficult to heal, and leaving an ugly scar, accompanied with a dark red, or rather purple discoloration. These two forms of the disease will be afterwards particularly considered.

SECTION II.

VENEREAL.

The venereal disease presents itself under two distinct forms; viz. that of gonorrhœa or clap, and that of lues venerea or pox. These two forms of the disease differ from each other in many essential particulars. Gonorrhœa, however virulent in its nature or long in its duration, never contaminates the system; it remains always a local disease; and when the specific inflammation by which it was engendered subsides, it ceases to infect or loses the power of propagation: nay, after a period more or less long, according to the virulence of the disease and state of the system, it ceases of its own accord, without the application of any remedy whatever, and thus a spontaneous cure is effected. Whereas lues venerea, although local at first, after a period more or less long, always affects the general habit, contaminates the whole system, and would never be eradicated without the aid of medicine.

Independently of these circumstances, which shew that gonorrhœa and lues are distinct diseases, I may remark, that gonorrhœa never communicates lues, nor lues gonorrhœa. These two diseases, however, may take place together, and do frequently occur at the same time in the same individual. If three healthy men were to have intercourse with a female labouring under both forms of the disease, she might communicate to the first gonorrhœa, to the second lues, and to the third, both gonorrhœa and lues. We sometimes meet with a patient who is apparently affected only with gonorrhœa, but upon minute investigation we also detect a chancre situated a little way within the urethra; but the chancre, from its concealed situation, is apt to pass unobserved, and thus a constitutional affection may be erroneously believed to follow from gonorrhœa. Chancres often heal without the use of mercury, more especially from the application of stimulant washes, and then secondary or constitutional symptoms appear at a future period. Now if a chancre be situated within the urethra, while the patient at the same time labours under gonorrhœa, the stimulating injection employed for the cure of the gonorrhœa will also accelerate the healing of the chancre, and thus a confirmed pox may apparently arise from a simple clap.

The circumstance of a female having both diseases at the same time, and communicating gonorrhœa to one man and lues to another, conjoined with that of a chancre being sometimes situated within the urethra of a patient at the same time having gonorrhœa, appears to me to have given rise to the error into which those writers have fallen, who assert that gonorrhœa and syphilis are the same disease, and that a constitutional affection may follow the former of these complaints. I have no doubt that Swediaur, Hunter, and Cullerier, may have seen the system thoroughly diseased from an apparent gonorrhœa, without any visible chancre from such occurrences as I have now described; hence I apprehend has arisen the fallacy of their reasoning.

That gonorrhœa and lues venerea are distinct diseases, is proved not only by their mode of operation, but by the periods of time at which they made their first appearance in Europe. Lues venerea is a disease of a recent date when compared with gonorrhœa. At what time the gonorrhœa appeared is not precisely known, although we find in 1162, King Henry II. in a parliament held at Westminster, passing an act confirming several ordinances and regulations respecting the public stews, and here the gonorrhœa seems to be alluded to under the name of *burning*. In this act it is expressly stated, that " no stew-holder shall keep any woman that hath the perilous infirmity of *burning*."

A Manuscript of John Arden, one of the surgeons to King Richard II., and quoted by Becket, who writes upon the antiquity of the venereal, contains a description of this disease of *burning*. He defines it to be " a certain inward heat and excoriation of the urethra," agreeing with the description of a clap. In the same Manuscript, written about the year 1380, is a receipt for the cure of the disease, which consists in the use of emollient injections; and in an old Manuscript in Becket's own possession, written about the year 1390, is a receipt for the " brenning of the pyntyl." From all which it would appear, that gonnorrhœa is a disease which has existed for many centuries; but we have indubitable proofs that lues venerea or syphilis first made its appearance in Europe after Columbus's return from the West Indies, about the year 1494,

All the writers who were cotemporary with Charles the VIII. of France, agree that the venereal first appeared in Europe towards the close of the 15th century, after the return of Columbus from the West Indies; and all the writers, both medical and historical, from the year 1496 till the year 1556, assert that this was a disease hitherto unknown. They generally call it the French disease, and the symptoms which they describe agree with lues and not with gonorrhœa, for many died, and others were mutilated, consequences which distinguish lues from gonorrhœa.

The description then of the disease introduced into Europe after the return of Columbus from the West Indies, agrees with lues, and not with gonorrhœa. We have a faithful detail of the symptoms collected from the writers of that time, and recorded by Jerome Fracastorius. These symptoms differ little from those which the disease presents at the present day. " When it first broke out amongst us," says he, " it discovered itself by the following symptoms: The patient was low-spirited, complained of weariness, and had a pale look; at last, for the most part, little ulcers appeared about the pudenda, which were extremely obstinate, and after they were cured in one part broke out afresh in another. Afterwards a kind of crusty pustules appeared upon the skin, beginning in some upon the scalp, (which was most frequently the case), and upon other parts in others. At first they were only small, but increased by degrees in a short time to the size of the husk of an acorn, and of nearly the same appearance, not unlike those scabs which appear on the heads of boys. Of these scabs there were several different kinds; some of them small and dry, others large and moist; some of a livid colour, some of a palish white, and some hard and reddish. All of them opened in a few days, and discharged a thick fœtid matter, nor can it be expressed what quantity of that matter perpetually discharged, or how offensive in its quality. Afterwards the ulcerated parts became eroded, in the same manner as those ulcers which are called phagedenic, and sometimes they infected not only the flesh but likewise the very bones. When it attacked the head chiefly, it produced acrid rheums, which eroded sometimes the palate, sometimes the uvula, sometimes the jaws and tonsils. In some it destroyed the lips, in others the nose, in others the eyes, and in others the whole pudenda. Besides this, in a great many the limbs were greatly deformed with gummy tumors, which frequently grew to the size of an egg or a small loaf, and being laid open, discharged a white mucilaginous matter. That tough hardness appeared chiefly in the arms and legs, and sometimes became ulcerated, sometimes it continued entire till death. But besides all the above mentioned symptoms, as if they were only trifling, there happened violent pains of the arms, frequently together, with the pustules, though sometimes before, sometimes after them, very obstinate and lasting, and excessively tormenting. They were most violent in the night, and the pain was not properly in the joints, but in the muscles and nerves. However, there were pustules sometimes without pains, and in some pains without any pustules, but the greater part were afflicted with both. In the mean time, all the limbs became feeble, and the body emaciated, the appetite quite lost, the patient had no sleep, but was either melancholy, or very passionate, with a strong inclination to lying in bed; his face and legs swelled; sometimes, though rarely, the disease was attended with a slight fever; some had a pain in the head, which was lasting, and not to be subdued by any medicines." *

This description agrees with lues, while that which we have already given, as extracted from the regulations of the public stews and Becket's manuscripts, applies entirely to gonnorrhœa, shewing that the two diseases appeared at different periods of time. They continued long under distinct forms, and only began to present themselves in combination about the year 1540; hence it was not till this period that gonorrhœa was enumerated or classed among the symptoms of the venereal disease, although it had been well known for several centuries previous to this time.

It appears, then, that gonorrhœa and lues are two distinct forms of venereal disease. The former, however long it may continue, and however much it may inflame and excoriate the glans and

---

* *See* Astruc *on the Venereal Disease.*

prepuce, will never produce a chancre, or give rise to a constitutional pox; but after a certain period the inflammatory symptoms will subside, the matter will change its nature, after some time cease to infect, and at last the disease will terminate *sua sponte*. A chancre, on the other hand, the first local symptom of lues, will never produce gonorrhœa; but after a longer or shorter time, if not counteracted by medicine, it will give rise either to a bubo, to a constitutional infection, or to both, but inevitably to the latter, which will never disappear without the assistance of medicine. *

---

* The French surgeons consider gonorrhœa and lues as the same disease. They contend, that the matter of gonorrhœa will produce chancre, and the matter of chancre gonorrhœa; and that a constitutional infection or confirmed pox may follow gonorrhœa as well as chancre. This doctrine will be found in a Treatise on the Venereal by Lagneau, who was house surgeon of L'Hôpital Des Veneriens in Paris under Cullerier. The work professedly adopts the opinions of Cullerier; is recommended by all the professors of medicine; is the reigning system in France; and must therefore be regarded as containing the current doctrines of the French surgeons on Syphilis.

They exhibit mercury in gonorrhœa as well as in lues; and from their practice, it must follow, that a French surgeon will be longer of curing a gonorrhœa in its incipient or acute stage than an English surgeon, because the mercury will further excite the inflammation, and prolong the disease; but if a patient presents himself with a gleet, or the chronic stage of gonorrhœa, he will cure him more quickly than the English surgeon, because excitement or increased action is chiefly wanted.

GONORRHŒA VIRULENTA.

A discharge of a purulent matter from the urethra in the male, and the vagina in the female, in consequence of the inflammation of the mucous membrane lining those passages, is termed a gonorrhœa. This discharge may arise from the application of any irritating substance, or it may be the offspring of a peculiar poison. When the discharge arises from simple irritation, it is termed Gonorrhœa Simplex ; when it follows impure coition, or is the offspring of a peculiar poison, Gonorrhœa Virulenta.

The simple gonorrhœa may be produced by any source of irritation, such as stimulating washes or injections, the introduction of bougies into the urethra, the imprudent use of cantharides, too frequent coition, &c. ; and the simple gonorrhœa so much resembles the venereal gonorrhœa, or gonorrhœa virulenta, that it is difficult to discriminate betwixt the two diseases. In both, there is the same coloured discharge, the same ardor urinæ, chordee, and other attendant symptoms, and they both follow coition ; but although they resemble each other in all their external features, there is one marked and very essential difference betwixt the two discharges : the simple gonorrhœa is the consequence of simple inflammation ; the virulent gonorrhœa, the consequence of a specific poison: hence the former cannot be communicated by connection, while the latter is highly infectious. Simple gonorrhœa also generally appears very shortly after coition when it arises from that irritation, while the virulent gonorrhœa follows at a greater distance of time.

When gonorrhœal matter is applied to the urethra, it in a longer or shorter time excites an inflammation which terminates in the formation of the same specific matter capable of propagating the disease; but till such time as this matter is engendered, or till the discharge takes place, no infection can be communicated; from which it follows, that an infected person may have intercourse with a sound one, betwixt the time the infection was received and the appearance of the discharge, and yet not communicate the disease.

Those who have once had gonorrhœa seem more susceptible of infection than those who have never had the disease. This is not only the case with venereal gonorrhœa, but also with that species arising from simple irritation. In this gonorrhœa resembles catarrh. The inflammation of the urethra is like inflammation of other mucous membranes. Inflammation, whether simple or specific, being more readily reproduced in mucous membrane than in any other structure of the animal body.

Gonorrhœa virulenta may be defined to be the natural discharge from the mucous membrane of the urethra or vagina, increased in quantity and altered in quality in consequence of an inflammation excited by a specific poison. The discharge, like that from other mucous membranes, is thicker or thinner, yellow or green, more or less profuse, and all the concomitant symptoms more or less distressing, according to the state of inflammation in the membrane: hence the same poison will produce a mild disease in one patient, and a most virulent disease in another, depending on the greater or smaller degree of susceptibility to inflammation in the membrane of the urethra or vagina. Although the urethra in the male, and the vagina in the female, be the natural and most common seat of gonorrhœa, yet the matter may be so applied, or the inflammation may so extend, as to excite a discharge from the glans and inside of the preputium in man, and from the entrance of the urethra and inside of the labia and nymphæ in woman.

Gonorrhœa is a much more frequent disease than lues, and men are more readily infected with it than women, notwithstanding the greater facility with which the matter is applied in the latter; because, in man, the membrane, which is the seat of the disease, is more delicate and irritable, of course more susceptible of inflammation.

The discharge generally appears a few days after exposure to the infection. It has in some cases taken place within twenty-four hours. On other occasions it has not occurred till the sixth week;

but the most common period at which it presents itself is from the third to the seventh day. It sometimes appears suddenly, but it is most commonly preceded by a thrilling titillation along the urethra, and an itching in the point of the glans. This is soon followed by a slight degree of heat on making water; in a short time, the lips of the urethra become swelled and inflamed, with an increase of moisture or secretion. The inflammation increasing, what was rather a pleasurable sensation at first, now becomes painful; the ardor urinæ increases; the calibre of the urethra is lessened; the urine is passed in a diminished stream, and more frequently than usual; the penis is affected with a heat, accompanied with a soreness all along the under surface of the urethra, which sometimes feels hard like a quill, a tendency to erection, and a distinct discharge which tinges the linen. These symptoms commonly succeed each other in the course of a few hours; but sometimes thirty-six or even forty-eight hours elapse from the first unusual sensation till the discharge is fully established.

The discharge is at first generally thin, of a greenish colour, sometimes attended with a fetid smell. In the course of a short time, it becomes more profuse, of a thicker consistence, and then assumes more the appearance of purulent matter.

The disease in this form may be considered as by no means severe; but it sometimes happens, that the inflammation increasing, a general swelling and tenderness of the whole penis takes place. The patient is annoyed with chordee or painful involuntary erections, particularly distressing during the night; the ardor urinæ is severe. Immediately after making water, a violent pain stretches along the urethra towards the neck of the bladder, and is felt particularly severe just above the pubis; there is a general tenderness over the perineum, scrotum, and testicles; the glans becomes swelled, is red like a ripe cherry, and matter of a fetid smell oozes out from all its surface; the inguinal lymphatic glands sometimes swell from irritation or simple inflammation, but not from the absorption of a poison, or from a specific inflammation; for when they do suppurate, which is sometimes the case, they always heal readily, without exhibiting the least sign of being contaminated with a morbid poison.

When the inflammation is considerable, the most distressing symptom is the chordee or painful involuntary erections. The inflammation is not confined to the lining membrane of the urethra, but extends throughout the substance of the penis; its whole structure is morbidly irritable, the vascular actions are increased, and the inflamed cells are perpetually injected with blood. From the general inflammatory action, there takes place into the cells an effusion of serum, which choaks them; consequently, when the blood is thrown in, they are partially and irregularly distended. This is the cause of the irregularities and curve downwards during the presence of the chordee. From the irritable state of the arteries, the cells are forcibly injected; their preternatural distension is resisted by the inflamed tendinous or fascial sheath which surrounds the penis; and this turgid state and partial injection of the inflamed cells, with the stretching of the inflamed fascia, produce the excruciating pain and curved form of the penis which always attend the chordee. This seems to me to be the cause of this painful involuntary erection, which is brought on by sitting before the fire, by inordinate stimuli, or by heat, and which is particularly distressing during the night from the heat of the bed.

The usual seat of gonorrhœa is within an inch or an inch and a half of the orifice of the urethra; but sometimes, in consequence of imprudence on the part of the patient, or of the practitioner, or of both, the inflammation extends along the urethra, greatly increasing the pain, ardor urinæ, chordee, and other distressing symptoms: sometimes the inflammation reaches the prostate gland and mucous membrane of the bladder, causing a frequent desire to pass the urine, which is done with intolerable pain and difficulty, or a total suppression, and sometimes it extends along the vas deferens, producing inflammation and swelling of the testicle. This extension of the disease is apt to be induced by subsequent acts of venery, intemperance, violent exercise, particularly on horseback, astringent injections, or the introduction of bougies during the early and acute stage of the disease.

When the inflammation runs high, the small glands, communicating by means of their ducts with the urethra, frequently inflame and swell, and can be traced externally by running the finger along the perineum; and when the inflammation extends to the prostate gland and lining membrane of the bladder, the distress is almost insupportable; all the neighbouring parts are thrown into a state of violent action; there is a constant desire to pass urine, accompanied with a tormenting tenesmus, great pain on pressure, and more especially upon the introduction of the finger into the rectum; and to these local symptoms is superadded great constitutional irritation, with symptomatic fever. When the prostate gland is inflamed and swelled, there is frequently a total suppression of urine; and when the mucous membrane of the bladder is affected, the urine is loaded with a glairy matter, which falls to the bottom of the vessel like the mucilage of gum-arabic, or rather like honey suspended in water.

When the lining membrane of the urethra is very violently inflamed, the discharge is entirely suppressed, and returns in proportion as the inflammation abates. In this particular, inflammation of the urethra resembles inflammation of the lining membrane of the trachea, where we find the expectoration checked by an increase of inflammation, and returning in proportion as the inflammation subsides. Even in very virulent states of gonorrhœa, the discharge is found to proceed from an inflamed, and not from an ulcerated surface. Mucous and serous membrane, and even the skin, secrete pus without abrasion of surface; hence pus is often secreted from the inflamed inner surface of the trachea, frequently deceiving the inexperienced practitioner, by giving cause to imagine that the pus is coughed up from vomicæ in the lungs, when it is expectorated merely from the inflamed mucous membrane of the wind-pipe.

TREATMENT OF GONORRHOEA VIRULENTA.

Gonorrhoea, like every other inflammatory disease, might be divided into two stages; the Acute and the Chronic; but we also add a third, which we denominate Intermediate; a division, which will be found of material use in practice, as for each of these stages we have a peculiar mode of treatment. The acute stage is characterized by the general tenderness, ardor urinæ, chordee, and other inflammatory symptoms. The chronic, by the cessation of these symptoms while the discharge continues; and the intermediate stage, is that state of the disease in which the inflammatory symptoms have so much abated as to lessen the general distress, but are yet not so completely subdued, as to constitute the chronic stage. In the acute stage, we employ warm anodyne injections. In the intermediate, we use our injections cold, and slightly astringent; and in the chronic stage, we have recourse to injections possessing high stimulating powers.

In the acute or inflammatory stage of gonorrhœa, cold astringent injections are highly improper. They produce stricture, increase the inflammation, and frequently by causing it to extend backwards along the urethra, swell the testicle, inflame the prostate gland and mucous membrane of the bladder, aggravating all the symptoms and prolonging the continuance of the disease. Every practitioner of experience must have observed this to be the consequence of the use of strong astringent injections in this stage of the disease. It should therefore always be our object to subdue the inflammatory symptoms, before we have recourse to astringent injections, and this in mucous membrane is more effectually accomplished by warm than by cold applications. In the ordinary states of the disease, where the inflammatory symptoms are not very violent, we use an opiate injection, in the proportion of one scruple of opium to six ounces of water. This injection should be thrown up warm, not forcibly but gently. It should not merely be injected once or twice, but continued for twenty minutes or half an hour at a time, and repeated four times a-day.

If the inflammation be still more distinctly marked, so as to be accompanied with tenderness of the penis, much ardor urinæ and chordee, independently of the warm opiate injection, we immerse the penis twice or thrice a-day in a bason of warm milk and water, or in an opiate solution. This we do for a quarter of an hour or twenty minutes at a time. We suspend the testicles, employ an antiphlogistic regimen, and avoid much exercise, especially riding on horseback. Nothing tends so effectually to allay the ardor urinæ, the painful involuntary erections, or chordee, as the warm opiate injections, and warm fomentations, with occasional doses of opium and camphor.

If, through the imprudence of the patient, the unskilfulness of the practitioner, or the virulence of the disease, the inflammation has extended backwards, swelling the urethral glands, and involving the prostate gland and bladder, we must have recourse to prompt and decided measures to alleviate the great distress which never fails to attend this state of the disease. We apply leeches to the perineum, and if the patient be of a plethoric habit, and in the meridian of life, we also abstract blood from the general system. We interdict all spirituous and fermented liquors, place him on a low diet, employ gentle laxatives, unload the rectum by means of clysters, conjoined with the occasional use of warm fomentations or the warm bath. We also derive considerable advantage by throwing into the rectum repeated clysters of warm water, which operate as fomentations: ten or twelve should be thrown up in succession, repeated three times in the twenty-four hours, and each of these warm lavations should be followed by injecting a small tea-cupful of starch, or mucilage of gum-arabic, containing sixty or seventy drops of laudanum. When these measures are adopted early and pursued with diligence, they seldom fail soon to subdue the inflammation in such a degree, as to enable us to proceed with the treatment of the second stage; and in the ordinary states of the complaint, the warm opiate injections generally allay the inflammation in two, or at most three days, seldom exceed five, and sometimes even prove successful in twenty-four hours; whereas, when we have recourse in the first instance to astringent injections, we are in danger of propagating the inflammation along the urethra, swelling the testicle and prostate gland, and inflaming the bladder, or inducing stricture or troublesome gleet; besides, it always requires a much greater length of time to effect a cure than when we subdue the inflammation, before we have recourse to the use of astringent injections. *

Independently of an appropriate local treatment in every state of the acute stage of gonorrhœa,

---

* Several army surgeons of late, have, in the treatment of gonorrhœa, employed injections of argentum nitratum, in the proportion of a scruple of the salt to an ounce of water, and

whether slight or violent, we prescribe a cupful of linseed tea, or mucilage of gum-arabic, to be drank five or six times a-day. We also conjoin with this twenty or thirty drops of the balsam of copaiva, with a few drops of laudanum, three or four times a-day, which has a wonderful effect in allaying the irritation and curing the disease. I have been in the habit of ordering half an ounce of the balsam of copaiva, and half an ounce of the Sp^t. Æ. ther. Nitros. to be mixed together with a drachm of laudanum, and a tea-spoonful to be taken three

---

this they use even in the most inflammatory stage of the disease. I cannot but consider this practice as highly dangerous, since one of two consequences must result from it. It must either destroy the structure, or increase the inflammation. If the injection is so strong as to destroy the structure, it will cause such ulceration as will require a considerable time to repair the breach, and be in danger of ultimately inducing stricture. If it does not destroy the structure, it will excite such a degree of inflammation, as will most likely extend along the canal, inflaming and swelling the testicle, prostate gland and bladder; it will render the urethra hard as a quill, and, in the majority of cases, will produce stricture. From an abstract of 20 cases, treated according to this mode in Edinburgh Castle, and recorded in the 14th vol. of the Edinburgh Medical and Surgical Journal, it appears, that the cure upon an average was accomplished in seventeen days and a third; whereas in the practice recommended in the text, viz. first subduing the inflammation by warm opiate injections and fomentations, and then having recourse to cold injections, rendering them gradually more stimulating, I will venture to assert, that the cure will be accomplished with the utmost safety in one-half the time.

times a-day. I have cured gonorrhœa with this internal medicine alone, as quickly as by the use of astringent injections.

When the inflammation has so far abated as to constitute what we have called the intermediate stage of gonorrhœa, we change our plan of treatment. We now use our injections cold, at first only slightly astringent, but gradually increasing their strength till all the inflammatory symptoms are completely gone, when we not only make them astringent, but highly stimulant. We perhaps continue the opiate injection cold for a day; next day we add to a six ounce opiate injection a few grains of the acetite of lead, or dissolve the opium in rose water instead of common water. In two days more we use injections a little more astringent, but not stimulating, such as an infusion of red roses, an infusion of green tea, a weak solution of alum, or a very weak solution of the sulphate of zinc, in the proportion of a grain of the salt to an ounce of water. In this stage we use all our injections cold, and instead of injecting for twenty minutes or half an hour at a time, as we do in the acute stage, we only throw up a syringe full twice at a time, repeating the operation seven or eight times a-day. We discontinue the linseed tea, or mucilage of gum-arabic, in this stage of the disease, but continue the copaiva and laudanum.

In proportion as the intermediate stage passes into the chronic, we increase the strength of our injection. One of the best is a solution of the sulphate of zinc. In the intermediate stage, before all the inflammatory symptoms are completely gone, we begin with this metallic salt in the proportion of a grain to an ounce of water, and increase the strength daily till the chronic stage is completely established, when we employ it in the proportion of ten grains to an ounce of water. This strength produces little uneasiness when increased by degrees, and is attended with the happiest effects, frequently curing a discharge in a few days, which, with a weaker injection, would have continued for weeks.

After the discharge has completely disappeared for two or three days, it sometimes happens that it is suddenly reproduced in consequence of too much exercise, drinking of spirituous liquors, and other similar causes; it is therefore advisable to continue the injection for eight or ten days after the discharge has entirely disappeared, and as we gradually increased the strength of the injection, so we gradually render it weaker, and use it less frequently, till we give it entirely up. In the chronic stage of the disease, we give up the use of the copaiva and laudanum, and employ no internal remedies whatever.

By adopting this plan of treating gonorrhœa, viz. first subduing the inflammation by warm opiate injections, then having recourse to cold injections slightly astringent, and gradually increasing their strength as the inflammation subsides, we are enabled to cure the disease in ten or twelve days, and sometimes in a shorter period, which would have required weeks according to the usual plan of having recourse at once to astringent injections.

In the cure of gonorrhœa in the female, we adopt the same treatment as in the male; only we make our astringent injections much stronger, because the disease is situated in the vagina, a structure much more insensible than the urethra in the male, and because the shortness of the urethra, and the absence of a prostate gland, remove the great risks arising from high inflammation, unintentionally induced in the male subject.

Swelling of the Testicle.

In gonorrhœa, when the inflammation rises high, from whatever cause it proceeds, whether as a natural consequence of the disease, from the imprudent use of astringent injections, from violent exercise or inordinate stimuli, the discharge always decreases, and sometimes is entirely suppressed. ~~If~~ In this state ~~of~~ if the inflammation extend backwards along the canal, it either involves the prostate gland and bladder in a state of high disease, or it stretches along the vas deferens, inflaming and swelling the testicle. From the suppression of the discharge and consequent swelling of the testicle, it was imagined by the humoral pathologists that the gonorrhœa was repelled, and had fallen on the testicle. The testicle was said to swell from " a retropulsed gonorrhœa," and with the view of lessening the inflammation of the gland, the return of the discharge was solicited by warm fomentations, by warm emollient injections, by the introduction of bougies into the urethra, and by reinoculation with gonorrhœal matter; but we know that when mucous membranes are violently inflamed, they cease to secrete. This is the case whether the secretion be healthy or morbid, and the discharge returns in proportion as the violence of the inflammation subsides.

From the inflammation extending along the vas deferens, the epididymis generally swells before the testicle. The body of the testicle is affected with a twirling or rolling motion; it becomes extremely tender to the touch, is attacked with shooting pain, swells and becomes hard. The pain stretches along the chord to the loins, is much increased in the erect posture, especially if the parts are allowed to hang; the inflammation soon involves the skin of the scrotum, which becomes hot and red. To these local symptoms is superadded symptomatic fever, indicated by quick and hard pulse, head-ache, thirst, nausea, and diminished secretions.

The testicle generally swells when the inflammation of the urethra is at the height; this, however, is not invariably the case, for it has been observed to swell at the apparent termination of the disease, when the discharge had entirely ceased, and the patient believed himself cured. We have already remarked, that when the testicle swelled during the violence of the gonorrhœal inflammation, the discharge from the urethra generally ceased. To this, however, there are exceptions; sometimes the gland swells before the running disappears.

The swelling of the testicle consequent on gonorrhœa, most frequently disappears by resolution. It rarely suppurates: sometimes it terminates in a scirrhous hardness which remains for years, and sometimes for life. This is more particularly the case with the epididymis than with the body of the testicle, and not unfrequently it terminates in effusion, forming a hydrocele. Sometimes with this effusion there is combined an enlargement and hardness of the testicle or epididymis, or of both.

Without having recourse to the doctrine of retropulsion or metastasis to account for the swelling of the testicle, it is obvious that the discharge disappears from the violence of the inflammation, and the testicle inflames and swells from continuity of surface, the urethra, vas deferens, epididymis, and tubular body of the testicle being all lined with the same mucous membrane. When we inject warm water or warm oil into the urethra, the inflammation subsides, and the running returns. From the subsiding of the inflammation in one part of the canal, it gradually subsides throughout the whole, and the swelling of the testicle abates, but not from the return of the discharge. It therefore appears to me to be absurd to introduce into the urethra bougies armed with gonorrhœal matter, as was done by Hirschel of Vienna and recommended by Swediaur. Any violent irritation in the urethra will swell the testicle; the application of a caustic bougie will sometimes do it. It is sometimes done by the introduction of the catheter in an inflamed state of the urethra. The introduction of all bougies, therefore, whether simple, as used by Bromfield and others, or armed with gonorrhœal matter, as practised by Hirschel and recommended by Swediaur, should be carefully avoided, as being very apt to increase the disease; the safest practice is to bleed, foment, and inject warm anodyne solutions.

Treatment of Swelling of the Testicle.

If, in attendance upon the first appearance of the disease, we confine the patient to a horizontal posture, suspend the testicles, and unload the rectum by means of a cathartic glyster; if the pain is not very violent, but the testicle only tender, the swelling not considerable, and the scrotum not much inflamed, we foment the parts (scrotum and penis) with a warm decoction of poppy-heads and henbane-leaves, with a warm solution of opium or of the acetite of lead, or even with warm water. We repeat the fomentation three times a-day, continue it for twenty minutes or half an hour at a time, and apply, in the intermediate time, cloths dipped in a warm solution of the acetite of lead, in the proportion of two drachms of the acetite to a pound of water, with a little acetous acid, to render the salt more soluble, and we inject into the urethra the warm opiate solution of the strength, and in the manner recommended for the cure of the acute stage of gonorrhœa. If the gland is much inflamed and swelled, the pain considerable, and the scrotum very red, conjoined with symptoms of fever, previous to adopting this treatment, we apply to the inflamed parts six or eight leeches, and immediately exhibit a brisk saline cathartic, such as an ounce and a half of the phosphate of soda, an ounce of the sulphate of magnesia, or six drachms of the tartarate of potash and soda. If the patient be in the meridian of life, of a plethoric habit, the pulse quick, full, and strong, and the other symptoms of fever strongly marked, it will be advisable, independently of the practice we have now recommended, to take twelve or fourteen ounces of blood from the arm, more or less, according to circumstances. By pursuing these measures, and repeating the cathartic, the local or general bleeding, as may be required, the inflammation and pain of the testicle soon abate, the inflammation in the urethra subsides, the running returns, and the gland is gradually reduced to its former size. But if the testicle and epididymis remain enlarged and hard, which is frequently the case, it will be advisable to place the patient on a course of mercury. The mercury should not be used till the inflammation has entirely subsided; and it should not be pushed so far, as to excite, in a high degree, the vascular actions of the system, as we are in danger of renewing the irritation in the testicle, reproducing the pain, and perhaps inducing a worse disease than that for which we exhibited the mercury. When there is conjoined with the enlarged and hard testicle or epididymis, an effusion into the tunica vaginalis, we first place the patient on a course of mercury, with a view to reduce the enlargement and hardness, we evacuate the fluid with a trocar and canula; and if all swelling and hardness be gone, we inject as in the cure of hydrocele; if any enlargement and hardness remain, we merely evacuate the water, and again renew the use of the mercury. As often as the fluid collects and becomes troublesome, we evacuate it, but never adopt the radical cure by injection till the hardness is gone, as there is a risk of reproducing an active disease.

Gonorrhœal Ophthalmia.

In the acute stage of gonorrhœa, it sometimes happens that the eyes become suddenly and violently inflamed, the eye-lids swell prodigiously, the pain is very acute, and the eyes are unable to bear the least light. From the inflamed conjunctiva, there soon takes place a puriform discharge, viscous, yellow, or rather greenish, like the matter of a virulent clap, and so acrid as to excoriate the cheeks.

The disease is generally sudden in its attack, violent in degree, and the action so great as frequently to terminate in loss of sight. The conjunctiva lining the eye-lids not only becomes much thickened, but frequently protrudes concealing the cornea; and the serous vessels of that portion covering the ball of the eye, become completely injected with red blood. From the delicacy of structure and violence of the action, blood is soon effused betwixt this coat and the sclerotica, which gives it a swelled and fleshy appearance like the villous coat or internal surface of the protruded intestinum rectum in children, forming what has been called Chemosis. The cornea now appears sunk; in a short time it becomes dim or faintly opaque; at other times partially or wholly opaque; sometimes it ulcerates, and the aqueous humor is discharged; the iris then either protrudes or comes in contact with the posterior surface of the cornea to which it soon adheres; the cornea becomes thickened and rises in the form of staphyloma; the structure of the organ is ruined, and the sight irrecoverably lost. In the early stage of the disease, there is generally violent headache, attended with a considerable degree of fever.

Gonorrhœal ophthalmia, like swelling of the testicle, has been ascribed to the suppressed discharge from the urethra; but I am rather inclined to think that it always arises from the direct application of the matter to the eye itself; because we see gonorrhœa every day suddenly disappearing from a variety of causes, and yet no affection of the eyes following. Again, we know that gonorrhœal matter applied to any mucous membrane will excite the same specific action, and produce the same discharge as from the urethra; hence the purulent ophthalmia which appears in infants shortly after birth, arises nine times out of ten from the tunica conjunctiva coming in contact with gonorrhœal poison in the passage of the child through the vagina, when the mother labours under that disease.

As illustrative of the application of the gonorrhœal matter producing this species of ophthalmia, of the violence of the disease, and of the loss of sight which generally follows, I may state the following facts.

Some years ago, I was consulted by a young gentleman of seventeen years of age, on account of a gonorrhœa recently contracted, but by no means severe. In a few days after his application to me, the eyes became violently and suddenly inflamed, the eye-lids much tumefied, and there took place a profuse discharge similar to that of gonorrhœa, excoriating the cheeks, and accompanied by great pain, considerable fever, and general restlessness; the discharge from the urethra did not at once disappear, notwithstanding the violence of the opthalmia. In a few days, his younger brother, a boy fourteen years of age, who never had been exposed to any venereal complaint contracted by sexual intercourse, and who slept in the same room, was similarly affected; and the disease in both eyes was equally severe as in those of the elder brother. I called Dr Monro and Mr J. Bell into attendance; but, notwithstanding every means that could be devised, the elder brother lost the sight of both his eyes, and the younger brother of one eye. If it be said, that in the elder brother the ophthalmia might arise from a consentaneous connection or sympathy betwixt the urethra and the conjunctiva, and not from the direct application of the virus, still this explanation will not at all apply to the younger brother who had no gonorrhœa, but who must have contracted the disease from actual contact; as by using the same towel or wash-hand-bason with his brother, wiping his face with the same handkerchief, or in some less obvious manner, and in whom it was equally severe.

Treatment of Gonorrhœal Ophthalmia.

The cure of gonorrhœal ophthalmia must be conducted in the same manner as gonorrhœa itself; only the means we have recourse to for lessening the vascular actions of the system, must be more vigorously pursued. As gonorrhœal ophthalmia is in general violent, and the fever considerable, we should immediately abstract blood largely from the general system, and repeat the operation as occasion may require. The blood may be taken from the veins of the arm, but it will be more advisable to open the temporal artery, as being more directly connected with the vessels leading to the seat of the disease. At the same time that we abstract blood from the general system, we should also have recourse to local blood-letting, by applying leeches to the temples and forehead. The patient must be kept cool, quiet, and in a dark room; the bowels unloaded, and the visceral secretions increased by saline cathartics; the strictest antiphlogistic regimen enjoined, and a blister applied to the nape of the neck, part of which should be kept open by issue ointment. While these means are steadily and vigorously pursued, we employ the same treatment to the eye as we do to the urethra. It should be long and repeatedly fomented with a warm solution of opium, in the proportion of half a drachm of opium to seven or eight ounces of water; or a warm saturnine solution, in the proportion of ten grains of the acetite of lead to six ounces of water. The eye must always be bathed with the solution heated; the fomenting or bathing should be continued long at a time, and repeated frequently to wash away the matter which is speedily formed, and which excites irritation and excoriates the cheek. When the violence of the disease has abated, that is, when the pain has subsided, when the discharge is fully established, and the fever and general restlessness considerably diminished, we use the opiate or saturnine solution cold; and in proportion as the acute stage of the disease subsides, we have recourse to more powerful astringents, the best of which are solutions of the sulphates of zinc and copper, in the proportions of six grains of the salt to six ounces of water, and gradually increased in strength as the acute symptoms abate. When the pain and discharge are nearly gone, and the disease in its chronic stage, presenting a fleshy and relaxed conjunctiva, the best applications are the tinct. theb. and ointments of the red oxide of mercury, and the sub-acetite of copper. The tinct. theb. should at first be diluted with water, and gradually increased in strength till we at last use it pure; a few drops are to be put into the eye twice a-day; and every night at bed-time, a little of the ointment of the red oxide of mercury, or of the sub-acetite of copper, should be inserted betwixt the eye-lids by means of a hair pencil.

These ointments should be made of the following strength: We take seven grains of the salt, and levigate it in a glass-mortar with a few drops of olive oil, till all the rough particles are completely destroyed, to which we then add two drachms of axunge, and mix them accurately together. These are the means which I have found most effectual in this species of ophthalmia. If the disease is not very violent they always prove successful; but if the symptoms are severe, notwithstanding all our exertions, the structure of the organ is frequently so completely destroyed from the violence of the action, as to terminate in loss of sight, which no operation that I am acquainted with can remove.

Gleet.

When the discharge from the urethra continues after the chordee, ardor urinæ, and pain of every kind have ceased, it is termed a gleet. This is just the chronic stage of gonorrhœa, and as the specific inflammation by which the gonorrhœal discharge was engendered is now completely gone, it follows that the matter is no longer capable of communicating infection. Gleet does not invariably succeed to gonorrhœa, the continuance of the chronic discharge being of short duration, unless the structure of the parts be so far weakened by the previous action as to render it permanent. When once a diseased action has taken place in the animal body, there is a tendency for that action to continue, or to be readily reproduced: hence it often happens, that after the discharge and every other symptom of gonorrhœa have completely disappeared, and even been absent for several days, in consequence of violent exercise, drinking, or other exciting causes, the running frequently returns, accompanied by heat and pain like a fresh infection. Whether this return be merely a simple inflammation of the urethra, or whether it be the same specific inflammatory action secreting matter capable of communicating gonorrhœa, I am unable to determine; but I am inclined to be of the latter opinion, because it appears to me that the previous inflammatory action has only been suspended, but not completely removed; and that in consequence of inordinate stimuli, and sometimes without any apparent cause, this action is reproduced or rather increased, having never entirely subsided, although from this doctrine it does not follow that every return of a discharge from the urethra will be gonorrhœal; for if the inflammation has completely subsided, and been absent for weeks or months, I should conceive that a new discharge, not arising from a fresh infection, will not communicate the disease.

This renewed discharge, accompanied by inflammation, cannot properly be denominated gleet, but rather a return of the gonorrhœa. A gleet, properly speaking, being a continued discharge from the urethra, after all the inflammatory symptoms are gone. There is a chronic stage, or state of debility and relaxation following all inflammations, but more apparent in the inflammations of mucous membranes, especially where the disease has been of long continuance, and this chronic stage succeeding gonorrhœa, is named gleet. It arises in consequence of the parts being weakened by the previous action, and is most commonly induced by neglecting to increase the stimulating powers of our injections as the inflammation subsides.

Treatment of Gleet.

From this view of the subject, it appears that gleet commonly depends upon local and not upon general debility, the remedies should therefore rather be confined to the urethra than applied to the general system. All these remedies are astringent or stimulating, such as injections, washes, bougies, and blisters. I remarked, that gleet frequently followed gonorrhœa from not increasing the stimulating powers of our injections as the inflammation subsides. Our object in the cure of gleet should therefore be by stimulating the urethra gently to inflame it, restore tone to the relaxed structure, and so change the mode of action. Injections, which are simply astringent, such as solutions of alum, of gum kino, or decoctions of oak-bark, are here of little value. The applications, independently of any astringent quality, should have a tendency to excite inflammation; and the excitement, if gradually applied, may be increased to a considerable extent, not only with the utmost safety, but with the most manifest advantage. The remedies we have recourse to, are injections of the sulphates of zinc and copper, injections of the muriate of mercury, of the tincture of cantharides, or aq. potass. very largely diluted; bougies and blisters to the perinæum, combined with the internal exhibition of cantharides; I have enumerated them nearly in the order of succession in which they should be used.

When a patient presents himself afflicted with gleet, we first begin with an injection of the sulphate of zinc, or of the sulphate of copper. If we use the sulphate of zinc, we add three grains of the salt to an ounce of water, and increase the strength of the injection every second or third day, till we perhaps use twelve or fifteen grains to the ounce. If we employ the sulphate of copper, we begin it half the strength of the injection of the sulphate of zinc, and increase it gradually till we arrive at five or six grains to the ounce. Although both these injections if used of this increased strength at the first, would violently inflame the urethra, yet when rendered stimulating by degrees, they will be found to have no such effect; in some cases, they will hardly be felt, but even require to be made stronger. Either of these injections should be thrown into the urethra five or six times in the course of the twenty-four hours, and their use persevered in for some time after the gleet has entirely disappeared. If it be found that one or other of these injections only represses the discharge, but does not completely remove it, the urethra may be more completely stimulated, or more thoroughly inflamed, by giving the patient internally the tincture of cantharides: we should first begin with fifteen or twenty drops three times a-day, increasing the dose two or three drops every second day, till such time as the patient has symptoms of irritation in the urinary organs, such as frequent desire to pass the urine, pain in the neck of the bladder or urethra, ardor urinæ or strangury, when its use should be suspended till these symptoms subside. Each dose of the cantharides should be largely diluted with water, to prevent it acting upon the stomach and intestines. The cure of gleet might at first be entrusted to the cantharides alone; but it will be more advisable at the same time to use one or other of the injections just named. I am most commonly in the habit of using the injection of the sulphate of zinc, and generally find, that along with the internal exhibition of cantharides after a longer or shorter time, it seldom fails to remove the disease. However, if this should be the case, we may change the injection. If we use the tincture of cantharides, we first begin with eight or ten drops to the ounce of water, gradually increasing the strength according to its effects. If we use the aq. potass., five or six drops to the ounce will be a sufficient strength to begin with; and if we employ the muriate of mercury, which I consider to be the best of the three, we begin with half a grain to two ounces of water. It is necessary to observe, that the urethra will not bear these injections of the strength we have now named, unless it has been accustomed to stimulating applications. If we therefore attempt the cure at once with any of these three injections, we must make them weaker than if we had preceded their use with injections of the sulphates of zinc or copper. If these means still prove inefficient to remove the gleet, we must have recourse to blisters to the perinæum, and the use of bougies. The blisters should be repeated again and again, and the bougie should be introduced into the urethra morning and evening, and allowed to remain till such time as it excites heat, accompanied with a slight degree of pain, when it should be withdrawn; and it will be found that every subsequent application can be continued for a longer time. The bougie slightly inflames the urethra, changes the mode of action, and, when withdrawn, is found covered with a thick and glairy mucus. If much general debility prevails, it will be advisable to employ the cold bath, bark, iron, or other tonics, and to place the patient on a nourishing diet; although I believe that in general gleet is a local disease, and to be cured by local remedies. Blisters and bougies, combined with the internal exhibition of cantharides, will seldom fail to effect a cure, unless the gleet depends upon stricture in the urethra, when it will remain incurable till such time as the stricture is removed.

Stricture of the Urethra.

Muscular hollow passages are the peculiar seat of stricture, therefore the disease is most incident to the urethra, the œsophagus, and the great intestines, particularly the rectum. Whatever excites inflammation in these passages, will produce it: hence one of the worst consequences of gonorrhœa in the male is stricture in the urethra. Strictures may be divided into two kinds, those which are spasmodic and those which are permament, depending upon a contraction, or rather increase of thickness, in some portion of the walls of the canal. Some writers reckon a third kind, which they call a mixed case, consisting of the permanent and spasmodic stricture combined; but all patients labouring under permanent stricture are liable to be occasionally seized with the spasmodic, and it would appear that the generality of strictures are at first spasmodic, but become permanent through time. Stricture in general has subsisted a long time before it is noticed by the patient; and sometimes it is only after the urine has been entirely suppressed in consequence of drinking too much wine or spirituous liquors, exposure to wet or cold, or other exciting cause, that the disease is suspected to exist.

The symptoms which lead us to suspect the presence of stricture, are, 1st, The long continuance of a gleety or apparently gonorrhœal discharge from the urethra, which has frequently been mistaken by the surgeon for a fresh infection or a simple gleet, and improperly treated by astringent injections. This suspicion of a recent infection is very apt to mislead the young surgeon, because the discharge is not only greatly increased in quantity after connection, but altered in quality from the irritation. 2dly, Frequent calls to pass the urine, particularly in the evening and during the night after the fatigues of the day, with long and considerable straining to effect it, while the stream is either forked, twisted, scattered, or much diminished in size. 3dly, Nocturnal emissions of the semen, an involuntary discharge of urine, uneasiness in the perinæum and about the anus, are frequent attendants on stricture; and, 4thly, When the stricture is considerable, there is violent straining, the urine is voided in drops, the bladder is thrown into a state of violent action, the pain extends to the loins and hips, and there is always deposited a quantity of a glairy mucous sediment. If the disease has subsisted long, and the irritation of the bladder be great, this sediment assumes the appearance of purulent matter. To these local affections are frequently superadded constitutional symptoms, such as occasional febrile attacks, assuming the intermittent type, affections of the stomach and head, and pains in the joints, particularly of the lower extremities. All the local symptoms are greatly aggravated, and sometimes a total obstruction takes place in consequence of drinking too much wine or spirituous liquors, being exposed to wet or cold, taking violent exercise, particularly on horseback, frequent connection, removing from a warm to a colder climate. These causes operate by exciting inflammation and producing spasm, not only in the contracted part, but in the whole of the urethra.

Some parts of the urethra are more subject to stricture than others; viz. those which are naturally of the least diameter. This is also the case in the œsophagus and intestines. Stricture in the œsophagus most frequently occurs in that part of the tube which is of the smallest calibre, and that is immediately behind the cricoid cartilage, where the pharynx joins the œsophagus. When stricture occurs in the intestines, it is in that part which bears the smallest relative proportion to the rest of the tube, as at the pyloric orifice of the stomach, in the descending colon, particularly at the sigmoid flexure, and in the rectum near the sphincter; and we find, that the most common seats of stricture in the urethra are immediately behind the bulb, about seven or seven and a half inches from the orifice; about four inches or four and a half from the entrance, at the external orifice, or immediately within it; but every part of the urethra is occasionally liable to become the seat of stricture; sometimes there is only one stricture, and sometimes there are two or even three.

Strictures in general are of very small extent with respect to the length of the passage which they occupy; but this observation does not always hold true, for sometimes the canal is diseased and contracted for the space of an inch and more. Plate 1st exhibits good examples of these two varieties of stricture. Sometimes the thickening of the membrane of the urethra is confined entirely to one side, while the opposite side is perfectly sound. Upon dissection, it is found that the diseased portion is always whiter and harder than the sound parts of the canal.

Stricture has generally been attributed to the effects of gonorrhœa or astringent injections. The disease, however, sometimes exists in children, and in men who have never had intercourse with women; but there can be no doubt that the causes to which it is most frequently referable are gonorrhœa, and the imprudent use of astringent injections in the inflammatory stage of that disease; although stricture may be produced by whatever inflames the urethra, as excess in venery, abuse of cantharides, absorption from blisters, stone in the bladder, irritation from gravel, &c.* Those who have been in warm climates seem particularly predisposed to the disease.

The consequences of stricture are dilatation of the urethra behind the strictured point, inflammation and thickening of the bladder, total obstruction to the flow of urine, and ulceration of the urethra. All these consequences are well exemplified in plate 2d, where the obstruction was so complete as to force me to puncture the bladder. When a stricture is considerable, and has subsisted for any length of time, from the repeated violent efforts in straining to pass the urine, the urethra becomes permanently dilated betwixt the stricture and bladder, the bladder is thrown into a state of violent action, it becomes inflamed, its actions are perpetually deranged, its structure is changed, it becomes thickened, and secretes a thick mucus, or the inflammation of its surface terminates in suppuration, and vast quantities of pus, as well as mucus, are discharged. When the stricture is still more considerable, and when the urethra becomes inflamed after exposure to cold or any kind of imprudence, the urine becomes totally obstructed, not only from the inflammation, but also from spasm. The pain and suffering are dreadful; and unless the spasm be relaxed by warm fomentations, the warm bath, blood-letting and opium; or the patient be relieved by puncturing the bladder, it bursts, or he dies of peritoneal inflammation, attended with low delirium.

---

* Whatever inflames the mucous membrane will induce stricture, not only in the urethra but in the other muscular hollow passages. In Mr Charles Bell's splendid museum in Windmill Street, I saw two beautiful specimens of stricture in the œsophagus, the one in a child, and the other in an adult, arising from swallowing soap-lees. I knew a case where stricture was instantly produced by throwing a very stimulating injection into the urethra, for the cure of gonorrhœa. The medical attendant ordered an injection, in the proportion of one grain of the nitrate of silver to the ounce of water. The patient injected only one syringeful, and stricture immediately followed.

A frequent consequence of stricture is ulceration of the urethra. One of the terminations of inflammation in hollow passages is ulceration, and it frequently happens that the membrane of the urethra ulcerates and the urine escapes. Sometimes it passes forward into the scrotum and loose cellular substance, causing gangrene, which terminates in extensive sloughing or death; but more commonly it forms a circumscribed tumor in the periœdum, which, suppurating and bursting, the urine is discharged by one or more openings, forming fistula in perinœo. The ulceration sometimes takes place immediately anterior to the stricture, sometimes in the site of the stricture by which it is destroyed, but more commonly immediately behind it. When the fistula is fairly established, the frequent calls to pass the urine cease, unless the structure of the bladder is so much changed as to lessen its cavity.

On the Manner of ascertaining the Situation, Form, and Extent of the Stricture.

When a patient presents himself with the symptoms now enumerated, we suspect a stricture, and should pass a bougie to ascertain its situation, form, and extent. We take a bougie of such a size as the orifice of the urethra will receive. As this is the most contracted part of the canal, any bougie which it admits will pass easily on to the bladder if there be no obstruction. Having oiled it, we enter the urethra with the right hand, while we stretch the penis with the left, and pass it along lightly and cleverly, that we may be better enabled to ascertain the degree of obstruction. When we meet with resistance and can pass the bougie no farther along, we mark upon it with the finger-nail the depth to which it has penetrated. We then take a graduated series, beginning with one a size less than that which we have just introduced, and pass them successively till we meet with one which enters the stricture with difficulty. This gives us an idea of the diameter of the contracted part when compared with the rest of the canal, and also informs us where the stricture is situated. We now take a white or soft bougie, of the same size with that which we have forced into the stricture, and having compared it with the first bougie, and marked upon it the depth of the stricture, we oil it, and in like manner pass it along the urethra till we reach the stricture, into which we gently force it, and allow it to remain till it becomes soft; then we withdraw it, and upon it we shall find distinctly marked the impression of the stricture. This will inform us whether the obstruction is merely a strictured ring, or whether the canal is contracted and diseased to some extent. This piece of knowledge of the utmost importance, for upon it depends the method of cure.

Having thus in some measure ascertained the situation, extent, and form of the stricture, we have now to consider the method of cure, whether we attempt it with the common or metallic bougie, or with the bougie armed with lunar caustic.

Methods of Cure.

We remarked that there were two distinct forms of stricture: one of small extent resembling a ring, and the other of a greater extent, involving perhaps an inch or more of the tube, which is contracted and hard for that space. (See plate 1.) I conceive the first of these to be the stricture which is suited for the lunar caustic, while the second is better adapted to the common or metallic bougie. If we use caustic in the second species of these strictures, we run considerable risk of penetrating the walls of the urethra and forming a false passage, particularly if the stricture be situated immediately behind the bulb where the canal takes a new direction. In the subject from which plate 3d is delineated, this occurrence took place; and if we should be so fortunate as to escape this by passing small bougies or catheters into the bladder from time to time, still we excite such repeated inflammation in the canal as ultimately to change its structure, giving it a hard and quilled feel from which it seldom recovers: besides, when the stricture is of considerable extent, it takes months before the caustic makes its way through. Sir Everard Home relates a case where the caustic was applied 486 times before a catheter could be passed into the bladder. In such a case, if the caustic was applied every second day, which would be as soon as the last eschar had separated, it would take nearly two years and eight months before the cure would be effected; a circumstance which evidently shows that this case was not suited to the caustic.

The danger of a false passage, the change of structure produced in the canal by the frequent application of caustic, and the length of time that is required to get through the obstruction, are good reasons for not attempting the cure in strictures of great extent by the caustic, and force us to have recourse to the common or metallic bougie. I admit that in some cases the surface of the stricture is so irritable, that the introduction of the common or metallic bougie produces excruciating and almost insupportable pain; but this irritability may be always readily destroyed by pencilling the surface of the stricture once or twice with caustic, which is done by introducing into it either a small bougie armed with lunar caustic, or the kali purum, agreeably to Mr Whately's plan. Again, if the stricture is of small extent, we prefer the lunar caustic to the common or metallic bougie, because the stricture is in general more completely destroyed, the cure more speedily effected, and more permanent; and if there is much irritability, there is less pain. When the stricture is irritable or inflamed, there is not only considerable pain upon forcing a bougie into it, but the irritable state of the stricture both induces spasm, and excites a distressing and frequent inclination to pass the urine, with pain and irritability in the bladder, which the first application of the caustic never fails in a great measure to remove.

The objections which have been commonly urged against the use of the caustic, are, that it frequently produces febrile paroxysms, that obstruction of urine is very apt to follow its application; that hemorrhagy sometimes succeeds; and that there is danger of forming a false passage.

There are certainly some constitutions in which every application of the caustic produces a paroxysm of fever, but such cases are extremely rare; when they do occur, they arise from peculiarity of constitution, and should not be allowed to affect any general rule of practice deduced from experience. The obstruction to the flow of urine which sometimes succeeds the application of the caustic, arises from the slough plugging up the urethra, and can always be removed by the introduction of a common bougie. If we are therefore called to our patient five or six hours after we have applied the caustic, and find him in great agony from being unable to void the urine, we have only to pass a small bougie; and upon withdrawing it, the urine will immediately follow. When the lining membrane of the canal has been destroyed by caustic, hemorrhagy takes place from the corpus spongiosum urethræ. When this occurs, it is always a sure proof that the stricture is destroyed, or nearly so. In such cases, the hemorrhagy rarely exceeds two tea-spoonfulls, and sometimes amounts only to a few drops; and in all the cases in which I have introduced the caustic or seen it introduced, which now amount to a very considerable number, I never saw an alarming hemorrhage except one. It occurred in a young gentleman twenty-two years of age, and followed the last application of the caustic to a stricture situated a little anterior to the bulb. The caustic was applied at ten o'clock in the morning. Upon the bougie being withdrawn, blood began to drop from the urethra, and continued to do so with little intermission till the next day at two o'clock, by which the patient was much reduced; however, he soon recovered from the debility and was completely cured of his stricture. The most troublesome accident that can happen from the use of the caustic, is the formation of a false passage. When we are gaining progress with the armed bougie, and find it at each application passing deeper, while the urine still flows with the same difficulty, we conclude that we are not in the tract of the urethra, but have got through its walls and are forming a false passage. A false passage is very apt to be formed even in expert hands, where the stricture extends to half an inch or more, and where its destruction is attempted by the caustic. However, this appears not to be the fault of the remedy, but of its misapplication. The caustic should only be applied to strictures of small extent; while contracted, and irregular portions of the canal should be treated by the common or metallic bougie.

1st,—*The Common and Metallic Bougie.*

The Common and Metallic Bougies both act upon the same principle in the cure of stricture: 1st, By dilatation operating as a wedge; and, 2d, By ulceration and consequent absorption. When a bougie of such a size as the stricture will readily admit, has been introduced and gradually enlarged, the stricture is then supposed to be cured upon the mechanical principle of dilatation: but when a large bougie has been forcibly thrust into the contracted part of the canal, and rapidly increased, it is then supposed that the cure is effected by producing ulceration; but in all living parts that are compressed, the activity of the nourishing vessels must soon be destroyed, and the part itself will either ulcerate or be absorbed. We see this happen even to the bones where caries and absorption is produced from the pressure of tumors. When we have ascertained the stricture to be of considerable extent, we have recourse to the common or metallic bougie. We take one of a pretty large size, oil it, and pass it down to the stricture. We mark upon it with the finger-nail the depth to which it has passed; then choosing one of a conical form, of such a size as we imagine will enter the contracted portion of the canal, and having compared it with the other bougie, and marked upon it also the depth of the stricture, we pass it down, and press with some degree of firmness to make it enter. That we may be sure it has entered the strictured portion, we withdraw the hand; if the bougie starts back, we know that the point has bent and not entered the stricture; but if it remains firmly fixed, and even requires some force to withdraw it, we know that we have gained our point. We ought never at first to allow the bougie to remain so long in the canal as to excite much pain; it ought to be withdrawn as soon as the patient begins to feel uneasy; perhaps a minute or two may be sufficient, and we repeat the operation next morning. After having introduced the bougie for several mornings in succession, and always increasing the length of time it is allowed to remain, we also gradually enlarge the bougie, till at last we are enabled to pass one of such a size as the point of the urethra will admit, which we then do evening and morning, and allow it to remain for an hour or more; for it is only from long-continued pressure, that we can expect to derive any benefit. Sometimes we experience a difficulty in passing in the morning the bougie we had passed the night before. I am therefore commonly in the habit of first passing a smaller bougie than that which I last introduced, and after allowing it to remain for eight or ten minutes, I withdraw it. This enables me to introduce immediately a bougie of such a size as I could not at first have introduced, or only with extreme difficulty.

I conceive the metallic bougie to be far superior to the common one; and when we attempt the cure upon the principle of dilatation, it should be preferred; because from the smoothness of its surface, it not only produces less irritation, but, from being made of firmer materials, it presses more steadily, and effects a more speedy cure. I also conceive, that where the urethra is irregular and diseased to any extent, it is much more adapted for such a case than the plaster bougie; the bougie of elastic gum ranks next to the metallic bougie, as being smoother, more durable than the common bougie, and less apt to crack or break in the urethra.

2d,—*The Caustic* or *Armed Bougie.*

The older surgeons were in the practice of introducing the red oxide of mercury, the sub-acetite of copper, and other escharotic substances, into the urethra, for the cure of stricture, or what they termed carnosities or fungous excrescences. The cure by caustics was also performed in France by empirics in the time of Saviard; and Wiseman gives pointed and clear directions for the use of the lunar caustic. However, this practice, from its indiscriminate use in the hands of Quacks, especially in France, had been productive of the most dreadful consequences, and had fallen into disuse, till it was revived by Mr Hunter about the year 1750; and since his time, it has been more extensively used by the Profession, particularly by his pupil and successor Sir Everard Home, whose practice in this department has been very extensive. From all that I have seen and practised, I am clearly of opinion, that where the stricture is of small extent, the caustic or armed bougie is the preferable mode of cure.

In using the caustic, we first take a common bougie of the full size of the canal, that is, of such a size as the point of the urethra will readily admit, and after having oiled it, we pass it down to the stricture. This removes any spasm that may be present in the canal, renders it wider, clears it of mucus, and enables us to ascertain the depth of the stricture. We now take an armed bougie of the same size, and having oiled it also, and compared it with the one we have just withdrawn, we mark upon it the distance of the stricture, and then pass it down to it with some degree of rapidity, to prevent any injury to the lining membrane of the urethra. We keep it applied to the stricture with a slight pressure; the patient first feels heat, and then a burning pain. The length of time during which the armed bougie should be applied, is from one to two minutes; but this must be in a great measure regulated by the feelings of the patient. The caustic, while it is in contact with the stricture, commonly produces very little pain; and it generally happens, that immediately after the first application, all that distressing inclination to pass the urine, with the pain and irritability in the bladder and urethra, ceases.

The armed bougie should in general be applied only every second day, that any inflammation which the caustic may have excited may subside on the intermediate day; but in some cases, where the stricture is very distressing, and attended with little local sensibility, it may be applied every day, and its use must be persevered in till such time as a bougie of the full size of the urethra passes easily forward into the bladder. This will require a longer or a shorter time, according to the extent and number of the contractions.* When the stricture is of some extent,

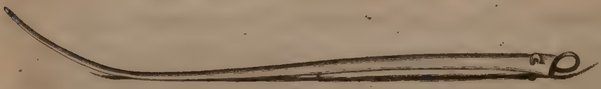
---

* The French surgeons, for the cure of stricture, never use the caustic. They seldom employ the common bougie, but generally have recourse to catheters made of elastic gum. When the obstruction is not complete, they take an elastic gum catheter of such a size as the stricture will receive. This they pass into the bladder, plug up its orifice with a small wooden peg, which they remove every five or six hours to evacuate the urine; but when there is fistula in perinæo combined with the stricture, they leave the catheter open; they confine the patient to the horizontal posture; at the end of four or five days, they withdraw the catheter, and immediately introduce another a size larger; and they continue increasing the size of the instrument every two or three days, till such time as the strictured portion permits a full-sized catheter to be passed into the bladder.

By keeping a catheter continually in the urethra, they effect the cure of stricture in a far shorter time than the English surgeons, who pass a bougie only occasionally, and retain it for a short time. So far their practice is good; but when the stricture is so complete that no instrument can be passed into the bladder, they have recourse to a harsh, and, what I conceive, a reprehensible practice. They force the stricture by means of a conical silver catheter. They take a small silver catheter slightly curved, of a conical shape and pointed and so complete that no bougie can be introduced, I am of opinion that we should open the urethra behind the stricture, if it is so situated as to permit this opening to be made in the perinæum; if not, that we should puncture the bladder from the rectum. Either of these operations, by abating the violent action, will relax the spasm

---

form, (sonde conique d'argent), such as is delineated in the marginal Plate. They pass it along the urethra, till it comes to the obstructed point, when they push it steadily in a horizontal direction straight forwards through the stricture. If the stricture is situated beyond the bulb, they introduce the fore finger of the left hand oiled into the rectum to guide the point of the instrument, and laying hold of its rings with the thumb and fore-finger of the right hand, they depress the handle, and carry the instrument straight forwards, endeavouring to direct its point in the axis of the neck of the bladder.



Roux's Sonde Conique.

By this mischievous practice, they often split the urethra; sometimes they carry the strictured portion before the point of the instrument, separating one part of the canal from the other, and allowing the urine to escape into the scrotum or perinæum; sometimes by tearing the urethra they produce pro-

and lessen the inflammation so much, that we shall generally be able on the following day to introduce a small bougie. We retain the canula in the bladder, or, what is preferable replace it by a catheter of elastic gum, and proceed with the cure of the stricture, either by the bougie or by the introduction of a small elastic gum catheter

---

fuse hemorrhagy from its spongy body; and not unfrequently they run the instrument betwixt the rectum and bladder, or betwixt the bladder and pubis, which, allowing the urine to escape in an inflamed state of the parts, often terminates in gangrene and death, or at best produces troublesome abscesses and sinuses difficult to cure. When they succeed in carrying the sonde conique d'argent into the bladder, they keep it there for three or four days, if the state of the parts will admit of it. They then withdraw it, pass a catheter of elastic gum, which they change every two or three days, increasing the size, and proceeding with the cure, as has been already described.

This practice seems to have originated with Paré, who was in the habit of carrying a pointed instrument through the obstructions. It was the invariable practice of Dessault at the Hôtel Dieu, was afterwards adopted by Boyer at La Charité, and is now followed and particularly patronized by his son-in-law Roux. But instead of following a practice, fraught with so much danger, it is surely preferable either to open the urethra behind the stricture, or to puncture the bladder from the rectum; the operation is easily performed, is quite void of danger, and should be done early. No sooner is the bladder punctured than its violent action immediately ceases; the spasm relaxes, the inflammation abates, and we are frequently enabled on the following day to pass a small bougie or elastic gum catheter into the bladder, which the inflamed and passed along the urethra into the bladder, where it is to be retained, and gradually increased in size till such time as the passage permits a full-sized instrument to be passed. After the canal is sufficiently pervious, we withdraw the instrument passed into the bladder from the rectum, when the artificial opening will immediately heal up, and the urine flow by the natural passage.

Ulceration of the Urethra and Urinary Fistula.

When stricture has once formed, it rapidly increases; and unless means are used to remove it, total obstruction either follows, or from the continued inflammation the membrane of the urethra ulcerates generally immediately behind the stricture, and the urine escapes into the cel-

---

spasmodic state of the stricture had prevented us from doing previous to the operation. I have repeatedly punctured the bladder under such circumstances, and always successfully; and in one case had recourse to the operation in consequence of the urethra being ruptured by a surgeon in attempting to introduce the catheter. There was no stricture, but I was unable to pass any instrument from its point getting through the opening into this false passage. After repeated attempts to pass the catheter, I punctured the bladder, and kept the canula in till the breach in the urethra healed, after which I passed a catheter along the urethra without any difficulty.

lular substance. Every effort that is made to empty the bladder, has the effect of injecting the cellular substance more and more; and if the ulceration is near the scrotum, the urine escapes into it; it becomes distended sometimes to the size of a child's head, the skin inflames, the patient is attacked with violent fever, the inflammation increases, profuse suppuration follows, or the parts fall into gangrene and slough, he sinks, is attacked with low delirium, and dies. But it most commonly happens, that the extravasation of urine is not extensive, particularly when situated in the perinæum; because its wide diffusion is prevented by the strong fascia which covers and binds down the muscles of the perinæum, and because the inflammation which inevitably follows the escape of the urine condenses the cellular substance, and circumscribes the extravasation till the skin inflames, and the abscess bursts externally. The external opening is therefore in general at no great distance from the opening of the urethra, although I have frequently seen fistulous openings situated in the tops of the thighs, and even in the upper parts of the hips. Such are the efforts of nature to relieve herself, that the ulceration always takes place in the lower part of the canal, that is, in the part nearest the external surface, and the stricture is frequently included in the ulceration, by which it is in a great measure destroyed.

Treatment of Ulceration of the Urethra, and Urinary Fistula.

If we are called to a patient immediately after the escape of the urine into the cellular substance, we should attempt to pass an elastic gum catheter into the bladder; if the stricture has been fortunately included in the ulceration, or if the obstruction is not complete, we shall most generally succeed. This will prevent all further escape, as the urine will flow by the catheter; and if the extravasation has not been extensive, the inflammation and swelling in the perinæum will, under the use of fomentations, gradually subside, and at last disappear without terminating in suppuration. In such a case we retain the catheter in the bladder, withdrawing it every two or three days, and immediately introducing another of a larger size, till such time as the stricture is completely destroyed, and the breach in the urethra healed. Besides the introduction of the elastic gum catheter, if the escape of the urine has been so considerable as to terminate in suppuration, an opening should be made with a lancet, and it should be treated like a common abscess by poultices and fomentations. If the stricture be so complete that no catheter can be passed, we must make an opening with a lancet into that part which is most tumid, and where we feel a fluctuation. This will allow the urine to escape, and the succeeding inflammation will consolidate into a sinus or tube, the passage through which it is transmitted forming the urinary fistula or fistula in perinæo. When we have given exit to the urine, we proceed to destroy the stricture either by the common bougie or the lunar caustic, while we use warm fomentations and poultices to lessen the inflammation and prevent gangrene. Although there should be several fistulous openings, whenever the stricture is destroyed by the bougie or caustic, and the canal again made free, in nine cases out of ten they will immediately heal up; if not, we must pass into the bladder an elastic gum catheter, to prevent the urine from passing by the wound. If this still should not prove successful, the sinuses must be laid open; we introduce along the natural passage a staff, which we carry into the bladder; we then pass into the fistulous opening a common director, and lay each sinus open with a straight bistoury its whole length till we reach the urethra. If the sinuses are not sufficiently large to admit the director and bistoury, it will be advisable to dilate them, which is easily done by the introduction of a piece of sponge tent a few days previous to the operation. After the sinuses have been laid open, we withdraw the staff, and introduce a gum catheter, which we allow to remain till the urethra heals.

If there should chance to exist a stricture to such an extent, that it is impracticable to destroy it by the caustic, or if the obstruction is so complete as to render it impossible to remove it by the bougie, we must perform an operation to restore the passage, the best way of doing which I think is this: We take a straight-grooved staff, and pass it along the urethra down to the stricture, where of course its progress is stopped. Retaining it in this situation, we next take a small common director, and after bending it as much as is required to suit the curvature of the passage, we introduce it into the external orifice of the fistula, carrying it forwards to meet the staff. After we have brought the points of these two instruments as nearly in contact as the stricture will admit, we take a straight bistoury, run it along the director, and not only lay open the fistula, but carry our instrument forwards into the urethra, till we meet the point of the staff. The fistulous tube and the diseased portion of the urethra being thus completely laid open, we now pass an elastic gum catheter into the bladder, and allow it to remain; the sore granulates, the parts heal over the catheter, and thus the continuity of the canal is restored. Although the urethra be extensively laid open, it heals as readily as any muscular part. I have seen it laid open to the extent of three inches for the removal of stricture, and it immediately healed over the catheter. I have also seen a surgeon, in cutting for the stone, instead of opening the urethra within the body in its membranous part, cut directly down upon the staff through the accelerator muscles, and opening it anterior to the bulb, carry his incision forwards to the bladder, still it immediately healed, leaving no fistulous opening. After the urethra has healed, and the catheter is withdrawn, large bougies should be passed daily, and the practice persisted in for a considerable time to keep the canal sufficiently distended, and thus prevent the recurrence of the disease.

LUES VENEREA.

The second and most virulent form under which the veneral disease appears, is that of Lues Venerea. There is every reason to believe, that lues must first present itself in a local form, before a constitutional affection can take place. Swediaur, Bell, and some other writers, are of opinion, that the venereal virus may be absorbed, and contaminate the system without producing any local disease. Some cases have no doubt occurred, which seem to countenance this opinion; but the general result of practice, the well-known acrimony of the matter, with the inattention and frequent incorrect statement of patients, lead me to believe, that the virus, where-ever applied, must always produce ulceration before absorption, or that a constitutional affection cannot take place without a previous local disease. It is also highly probable, that a person labouring only under constitutional symptoms of lues, will not communicate the disease to a sound person, either by sexual intercourse or by lying with him in the same bed; but that to propagate the disease, it is requisite that the poison be in actual contact; hence the disease is generally caught by kissing, coition, sucking a diseased nipple, or from matter being applied to a wound or abraded surface.

Lues affects chiefly the glandular system, mucous membranes, skin and bone; sometimes it remains long a local disease, and sometimes the system becomes early affected. It does not uniformly pursue the same course, but in its progress we can generally trace three distinct stages in the succession of symptoms, from its first appearance till the system becomes thoroughly contaminated. 1st, The purely local symptoms which embrace chancre and bubo. 2dly, The primary constitutional symptoms, which consist in sore throat and eruptions on the skin; and, 3dly, The secondary constitutional symptoms marking a deeper rooted disease, such as nodes and other affections of the bones; ulcers in various parts of the body, constituting the secondary venereal ulcer; alopecia, blindness, and deafness, with attendant hectic fever and marasmus.

CHANCRE.

The first effect of the application of syphilitic matter to a healthy surface is to excite a peculiar inflammation, which terminates in ulceration, assumes a specific action, and secretes matter capable of communicating the disease. This primary venereal ulcer is called a chancre. Chancres arising from impure coition most commonly present themselves in the male upon the glans penis, frequently close by the frenum, and upon the inside of the preputium; in the female upon the nymphæ, inside of the labia, and in the entrance of the vagina, but seldom within the passage. In these situations the cuticle is thin, the matter is directly applied, and it is apt to lodge, but chancres not unfrequently occur upon the outside of the preputium, upon the body of the penis, upon the pubis, and even upon the scrotum; and, in the female, upon the outside of the labia, upon the perinæum, and upon the rounded part of the hip, close by the anus. Chancres also sometimes appear in the male a little within the urethra. The reason that they do not frequently appear in this situation seems to be, that the discharge from a chancre is not so copious as that in a gonorrhœa, and therefore cannot be so directly applied to the urethra as to the glans or preputium.

The appearance of chancre upon the glans penis, or inside of the preputium, is generally denoted first by an itching. Upon examination the part is observed to be slightly inflamed, the itching increases, the inflammation becomes more apparent, the surface tender, and a distinct pimple or pustule appears containing matter, and covered by a thin skin. The skin bursts, and a distinct ulcer is formed, deep in the centre, with hard edges, a firm base, and accompanied by more or less surrounding inflammation. The discharge from the ulcer is at first in small quantity, but in process of time becomes more profuse, and the pain is always proportioned to the attendant inflammation.

This is the usual course of the disease; but sometimes no distinct pustule is formed, and the inflammation at once terminates in ulceration, at first, so superficial as to resemble an excoriation, but which, in process of time, becomes deep with hard and irregular edges, an acrid and fœtid discharge, and other characteristic marks of a venereal sore. When chancre presents itself upon the external surface of the parts of generation, as upon the outside of the preputium, upon the body of the penis, upon the pubis, scrotum, outside of the labia, in the perinæum, or upon the hip, the disease is always longer of appearing than when the matter is applied to a more tender surface; and the ulceration is generally not preceded by a distinct pimple, but the skin inflames, cracks, ulcerates, and oozes out a glutinous matter, which covers the ulcer in the form of a scab, and which when removed, is speedily reproduced.

There is great variety with regard to the period of time at which the disease follows the exposure to the infection I have known chancre distinctly marked in twenty-four hours after impure coition; sometimes it has occurred earlier; sometimes so late as the fifth or sixth week; and on other occasions, though rarely, even later still; but the most common period is from the third to the fifth or sixth day. There are generally more chancres than one; most commonly they remain for some time stationary, or at least increase in size very slowly. At other times, they spread very rapidly. Chancre, like every other ulcer, increases in size, in proportion to the accompanying inflammation. When there is little inflammation, it remains long stationary; but when the inflammation is extensive, it spreads rapidly.

TREATMENT OF CHANCRE.

In the cure of Chancre, a local should be combined with a constitutional treatment. Some undervalue all local means, trusting entirely to constitutional remedies, but I apprehend that local applications ought uniformly to be employed, and whether the chancre be recent or of long duration, whether it be inflamed or indolent, for the following reasons: If the chancre is recent, it is most probably as yet a local disease; absorption may not have taken place, consequently the system will not be affected. In these circumstances it is an object of the first importance to heal the chancre as quickly as possible, in order to prevent a constitutional affection. On the other hand, if the chancre has been of long duration, absorption has most probably taken place, the system is affected, the chancre is kept up by the constitutional affection, and must now be viewed as a secondary venereal sore. Yet it is still of consequence to heal it as speedily as possible, for while it secretes matter capable of propagating the disease, the system is liable to be kept perpetually infected from the renewed absorption. No doubt the general exhibition of mercury will sooner or later change the nature of the sore, so as to convert it into a simple ulcer, which can have no deleterious effect upon the system, yet as we have no criterion to regulate our conduct in such cases, we generally use mercury long after this change has taken place. We continue it not only till the sore is completely healed, but some time longer to ensure the patient's safety; hence if we do not accelerate the healing of the sore by local means, we should keep the patient much longer than would be otherwise necessary under the operation of mercury, and thus protract the cure. Besides, we know that sometimes a venereal sore will not heal by the constitutional action of mercury alone, and if we continue the mercury, or push it farther with a view to effect the healing of the sore, we are in danger of increasing its irritability, and converting it into the irritable mercurial ulcer. If the chancre is inflamed, we have recourse to a local as well as a constitutional treatment, as being the most efficacious in subduing the inflammation; and if it is indolent, the reasons now assigned shew that we ought to have recourse to the one as well as the other, to increase the action, and heal it as quickly as possible.

The treatment of chancre, it is evident, must vary according to the state of the sore. When a patient presents himself immediately after its appearance, the disease is then entirely local, and might be cured by local remedies alone; still we always have recourse to the general use of mercury, as it would not be safe to trust solely to a local treatment. In this recent state of the chancre, it is not only safe, but proper, either to remove it with the knife, or destroy it by caustic; the knife is frequently inadmissible; we therefore generally have recourse to caustic.

Some practitioners are in the habit of applying caustic to chancres in whatever state they may be; but this is highly improper. It is evidently improper if there is much inflammation; because, by such treatment, the inflammation will be increased. Caustic will destroy the irritability of a sore; but if there is much surrounding active inflammation, and particularly if that inflammation be in an unhealthy habit, caustic will increase it, and cause the sore to spread. When a chancre is recent, and we destroy it by caustic, we convert it into a simple sore, and it immediately heals, because the system is not yet affected; but if the chancre is of long standing, and we employ caustic, so far from healing the sore, we will in general increase its size. Caustic will not convert it into a simple sore, till such time as the virus in the habit is corrected by mercury; and if it succeeds in healing it, which is no doubt sometimes the case, particularly when applied in so diluted a state as to be merely stimulant, a confirmed pox will shortly follow. If the chancre, therefore, has been of some duration, the exhibition of mercury should always for some time precede the application of the caustic.

In the management of primary venereal sores, we proceed thus: When a patient presents himself with a chancre, if there is little inflammation, and if the sore is recent, we touch it freely with the argentum nitratum, and immediately apply a little dry lint; at the same time we put the patient upon a mercurial course, which we continue till it exerts visible effects upon the system; that is, till the pulse is increased in frequency, and the mouth becomes sore. When the eschar separates, if the caustic has been freely applied, the sore is generally in the state of a simple ulcer, requiring no farther local application than a bit of dry lint; but if it remains stationary, and does not heal under the operation of the mercury, we increase the action in the part by washing it occasionally with a solution of the sulphate of copper, in the proportion of five grains of the salt to an ounce of water; or we wet a bit of lint in the solution, and keep it constantly applied. During this local treatment, we keep the system under the full influence of mercury till the sore is healed, and for some time after, to guard against the possibility of any constitutional affection from absorption. If the chancre has been of long continuance before the patient has applied, if it is tolerably clean, and if there is no great inflammation, our first step should be to place him under mercury, to push the medicine till such time as the system is completely affected, and to apply to the chancre either dry lint, or, what is preferable, the ash-coloured oxide of mercury or the sub-muriate of mercury; a little of either may be sprinkled upon the sore morning and evening, which should be then covered with a little lint, and the old powder regularly washed off before a fresh quantity is applied; or a convenient dressing may be prepared, by suspending two drachms of the sub-muriate of mercury in six drachms of the mucilage of gum arabic. This is the liniment which I generally employ, and find to answer every purpose in this state of the sores. After the chancre becomes clean, it generally heals under the operation of mercury, with no other dressing than lint, applied in the manner now mentioned. If not, we apply the solution of the sulphate of copper, or a weak solution of the nitrate of silver, in the proportion of two grains to an ounce of water. When chancres are foul, and there is no particularly marked inflammation, we may dress them with the red oxide of mercury, or touch them occasionally with a solution of the argentum nitratum, containing six grains in an ounce of water, or with a solution of the muriate of mercury, in the proportion of two grains of the salt to an ounce of water. When they become clean, we use the submuriate or dry lint, or the solution of the sulphate of copper, according to circumstances; but whatever local applications we employ, we must bear in mind that no patient is safe unless he is kept during the whole of the cure under the full influence of mercury.

The chancres most difficult to manage, are those attended with much inflammation, particulary in unhealthy habits; for in such habits, if the vascular actions are much increased by mercury, and the chancres irritated by escharotics or stimulating dressings, the inflammation is in great danger of increasing violently, and terminating in mortification and sloughing of the preputium or glans, and, in some cases, of the whole penis. When chancres are attended by inflammation, no caustics or stimulating dressings should be employed. The best applications are warm solutions of opium and the acetite of lead. The penis should be immersed in one or other of these solutions for a quarter of an hour or twenty minutes three or four times a-day, and in the intervals a bit of lint wet with either, kept constantly applied. Where the swelling of the prepuce is so great as to prevent the glans from being denuded, independently of the immersion of the penis, the solution should be injected warm under the foreskin every two hours. If the inflammation is not very extensive, the patient should be at the same time put upon a course of mercury; but if it be considerable, and attended with pain and swelling, no mercury must be used till these symptoms in a great measure subside; or if the patient is under a course of mercury at the time that these appear, the mercury must be immediately abandoned. Whenever a venereal ulcer, situated on the penis, or indeed any where else, becomes inflamed during a mercurial course, the mercury should be immediately given up, although the sore be clearly venereal; because, if its use is persevered in, the inflammatory action will be increased, the inflammation will rapidly extend, it will most likely terminate in gangrene, and the patient will run the risk of losing a part or the whole of his penis; whereas, if the mercury is given up till the inflammation is allayed by fomentations, poultices, opiate and saturnine solutions, with general and local bloodletting, the sore, although venereal, may still make so little progress as to be completely under command. It is by not attending to this, and pushing the mercury, with the local use of irritating substances during a state of inflammation, that we so frequently see patients losing the prepuce, the glans, or a great part of the penis. For the same reason that we interdict the use of mercury and those local applications which tend to excite the action in the inflamed part, we also refrain from cutting the prepuce in high states of inflammation. When the prepuce is so much inflamed and swelled that the glans cannot be denuded, the chancres can always be easily dressed by injections, or a probe covered by a bit of lint can be passed in betwixt the preputium and glans to keep the chancres clean: whereas, if we slit up the preputium, we increase the inflammation, and are in danger of producing sloughing; or at best, the cut edges from the application of the virus become venereal sores. I apprehend that the operation for phymosis should never be performed in such circumstances, but reserved for congenital states of the disease, or where the prepuce, from thickening and stricture in consequence of previous inflammation, cannot be brought back.—When the glans has been denuded, and the prepuce cannot again be brought forward in consequence of the inflammation and swelling forming paraphymosis, it will in such circumstances be requisite, if there is much stricture on the glans, to remove it by cutting the prepuce. This must be done, however much inflamed, and is best accomplished by an incision with a lancet or scalpel carried through the thickness of the strictured ring in the situation best calculated to relieve it. When this is done, no attempt should be made to bring forward the foreskin, but it should be allowed to remain till the inflammation completely subsides.

The most powerful means of subduing this high inflammation, which is so apt to terminate in gangrene, is to give up the mercury, to interdict the use of wine, spirits, fermented liquors, and animal food; to place the patient upon a low diet, to keep the bowels freely open by cooling laxatives, and to abstract blood from the general system proportioned to the age, plethoric state of the patient, and violence of the inflammation. While we pursue these general means, we employ as local remedies warm opiate and saturnine fomentations, injecting them at the same time betwixt the prepuce and glans, with warm saturnine poultices. Leeches may also in some cases be applied to the penis; but this must be done with considerable limitation, as the bites are apt either to terminate in gangrene, or to become venereal sores. If these remedies have been employed early, and the use of them carefully persisted in, they will in general prove successful; and when the inflammation has completely subsided, we resume the mercury, having recourse to such local applications as are best suited to the state of the chancres.

BUBO.

A swelling of a lymphatic gland, in consequence of venereal inflammation, is termed a Venereal Bubo. Bubo most commonly presents itself as a sequence of chancre, and occurs in the neck, arm-pit and groin, but, for obvious reasons, most frequently in the groin. All writers ascribe their origin to the absorption of venereal virus, inflaming and swelling the gland in its progress through it to pass into the circulation. The solidity of this doctrine, however, I very much doubt. It appears to me that a bubo arises from an inflammation excited in the extremities of the lymphatics by the chancre, and not from absorption: That this inflammation courses along the vessels till it reaches the contiguous gland, which it inflames and swells precisely in the same manner as the inflammation in gonorrhœa inflames and swells the testicle by passing along the urethra and vas deferens, till it reaches the epididymis and testicle: hence in bubo the patient always feels, in the course of the lymphatics situated betwixt the chancre and inflamed gland, a sense of tenderness on pressure; and we are sometimes enabled to trace distinctly with the finger the inflamed vessels running along the sides of the penis.

My reasons for believing that bubo does not arise from the absorption of the virus, are the following: 1st, If this were the case, the lymphatic glands in the more distant parts of the system, and the internal as well as the external should occasionally be affected; whereas we always find the inflammation and swelling limited to the external glands nearest the seat of the chancre; and if bubo does not occur in the contiguous glands, it never takes place in any other. Those who maintain that bubo arises from absorption, ascribe this circumstance to the virus becoming more diluted as it passes into the system; but to shew that this cannot be the case, we have only to reflect upon the state of a bubo after suppuration. Here the matter is both profuse and capable of communicating the disease; yet no bubo ever takes place in those glands which immediately succeed in the course of the lymphatic circulation; another instance tending to shew that the glands do not inflame and swell from the absorption of the virus. 2dly, Though the matter is as readily absorbed in the secondary venereal ulcer as in the primary, yet bubo seldom arises from secondary venereal sore; from which Mr Hunter was erroneously led to infer that the matter of this ulcer would not contaminate the system; but the reason that it is so seldom followed by bubo, is, that it is rarely inflamed; when it is in an inflamed state, bubo as certainly succeeds the secondary as to the primary venereal sore. 3dly, If bubo arises from the absorption of the venereal virus, how does it happen that the system is often completely contaminated by this absorption, without any bubo taking place? If the syphilitic matter possesses such a degree of virulence as speedily and violently to poison the system, it ought from the same virulence to produce bubo, if bubo arose from absorption. We frequently see a complete constitutional affection follow the existence of chancres in an indolent state indicating absorption; but bubo never occurs till the chancres become inflamed. In fact, a bubo prevents a constitutional contamination, unless the matter has been absorbed previous to its appearance. When the lymphatics leading from the chancres to the inguinal glands are much inflamed, and the glands themselves are in the same state, the passage of fluids through them is obstructed, and the matter does not so readily pass into the system: hence a constitutional affection is not so apt to occur after the existence of bubo as when no bubo has taken place. 4thly, The glands in the axilla and those above the clavicle often inflame and swell in cancer of the mamma long before any matter is formed in the breast; and if these glands suppurate, the suppuration is always succeeded by a cancerous sore. This affection of those glands is always observed to follow more or less readily, in proportion to the attending inflammation. 5thly, The glands in the higher part of an extremity frequently inflame and swell, and even proceed to suppuration, from a thorn in the flesh or prick of a sharp-pointed instrument in the lower part of the limb, without any matter being inserted with it, or formed in consequence of it. In such cases, we can generally trace the inflamed lymphatics all along the limb from the seat of the injury till they terminate in the affected gland: indeed, inflammation excited in any lymphatic will inflame and swell the neighbouring glands, and the inflammation in the gland will be of the same character with that in the lymphatic itself.

From the consideration of these circumstances, as well as from observing that the lymphatic glands are never affected in ulcers, whether venereal or not, till the ulcers become inflamed, I am persuaded that bubo rarely if ever arises from the absorption of virus, but generally, if not always, from an inflammation excited in the extremities of the lymphatics, which follows the course of these vessels till it reaches the contiguous glands; and if the inflammation be of a simple nature, as in the bubo arising from gonorrhœa, or from a prick in the finger or toe, although the gland should suppurate, if there is no scrophulous taint in the system, it will immediately heal like a common abscess. If the inflammation be venereal, after suppuration it will take on the venereal action, and become a venereal ulcer; and if it be the cancerous inflammation, it will assume the cancerous action, and become a true cancerous sore.

Bubo never takes place in the indolent state of chancres. There is always a certain degree of inflammation; and the greater the inflammation, the more certainly does bubo succeed: hence caustics and other irritating applications to chancres are particularly apt to induce bubo. For the same reason, bubo is more apt to occur in the recent state of chancre than where it has existed for some time, and to follow chancres on the prepuce more readily than chancres on the glans, because the former are more frequently inflamed than the latter. All the lymphatics arising from the glans and prepuce generally pass through the upper cluster of inguinal glands. These glands, therefore, are the most common seat of bubo. One gland only is in general affected, and the inflammation is at first confined to the body of the gland, then the cellular substance, skin, and other surrounding parts are drawn into disease.

In the formation of bubo, the patient first feels a stiffness in the groin, followed by a heat and slight pain, particularly in walking. Upon examination, a gland can be distinctly felt enlarged, and painful on pressure. It becomes larger; and if not checked in its progress, it involves the neighbouring structure; is attended with a throbbing pain, usually accompanied by a very uneasy burning sensation; it proceeds to suppuration; the skin puts on a red colour, which becomes darker, and afterwards purple; the integuments at last ulcerate, and the matter is discharged; but the tone of the parts is in general so much destroyed, that the succeeding ulcer is long in cicatrizing, and most commonly leaves an ugly scar.

Treatment of Bubo.

As bubo is an inflammatory disease, and as the inflammation is of a specific character, it is obvious, that in the treatment of it we should adopt those means which are best calculated to subdue inflammation in general, while we at the same time employ the remedy which experience pronounces best suited to the specific nature of the disease. In all stages of bubo, it is a primary object to employ mercury in sufficient quantity to destroy the venereal action, and to protect the system from the effects of the poison. For this purpose, mercury may be exhibited in a variety of ways, but here it is most advisable to administer it in such a manner that it may come in immediate contact with the inflamed gland. The best way to effect this, is to apply it to that surface from which those absorbents arise that lead to the affected gland; the mercury should therefore be rubbed in on the inside of the leg and thigh of the affected side. It should be used evening and morning, and applied in such quantities as to place the system speedily and completely under its influence. As the motion of friction is not only fatiguing to a patient in such circumstances, but tends much to irritate the gland, it is proper that the mercury should be rubbed in by another person. From the irritation produced in consequence of the friction, a painful inflammatory pustular eruption is apt to take place. To obviate this as much as possible, the hairs should be shaved off the inside of the leg and thigh previous to commencing the frictions. From half an ounce to an ounce of strong mercurial ointment should be briskly rubbed in for half an hour evening and morning, till the pulse becomes quick, with other symptoms of fever, and the mouth is slightly affected. If this practice is adopted in the incipient stage of the bubo, it will in general discuss it; although it will be prudent at the same time to put the patient on a low diet, to enjoin absolute rest, and the horizontal posture, and to keep cloths, wet with a saturnine solution, constantly applied to the groin. If the bubo is attended with much heat and pain, a few leeches should also be applied; and if the patient be vigorous, and in the meridian of life, with acceleration of pulse, it will be proper to abstract blood from the general system by venesection. If the bubo has made much progress, is very large, and the skin discoloured, it will be advisable to lay aside the cold applications, and to employ warm opiate or saturnine fomentations and warm saturnine poultices, with a view to bring it to suppuration, although these means frequently materially assist in its discussion. We at the same time continue the mercury, if the system is not violently affected; for it has sometimes happened, that even after the formation of matter, buboes, under the operation of mercury, have been dispersed without bursting. When matter is once formed, we use warm fomentations three or four times a-day; and in the intervals warm poultices to soften the tumor, and to promote the ulceration of the integuments and escape of the matter. But if the bubo is inclined to become very large, and is long of bursting, it will be proper to discharge its contents by making an opening with a lancet at its inferior part. If this is not done, the integuments become so much distended that their tone is lost, they ulcerate largely, and the sore is long of healing. *

---

* The French surgeons generally open buboes by caustic; and they assign as a reason for this practice, that the caustic makes an opening much larger than nature or any cutting instrument, which enables the bason of the abscess to fill up from the bottom; that the caustic destroys the over-distended integuments, the structure of which is often so deranged as to render them incapable of adhering to the opposite walls of the abscess; and, finally, that the caustic excites in the neighbouring parts, which are more or less obstructed, an action tending to effect resolution.

When the bubo has been allowed to burst of its own accord, if the matter has not a free exit, it should be laid open to its most depending part, to allow of its free escape, to prevent the formation of sinuses, and to expose it to the air, after which it should be dressed with dry lint. If the bottom of the ulcer is foul, it should be daily sprinkled with the red oxide of mercury, covered with dry lint, and warm poultices applied till such time as the sore begins to granulate, when dry lint will be found to be the best dressing. It sometimes happens, that the ulcer, following a bubo, is prevented from healing by the tone of the integuments being quite destroyed by the previous inflammation and extreme distension. In such cases they must either be destroyed by caustic, or removed by the knife. After the ulcer has become clean, and all venereal taint removed, it in general granulates fast, and at last cicatrizes. When this is not the case, and the sore remains stationary, its healing may be promoted by touching it occasionally with the sulphate of copper, or what is preferable, by applying a little lint wet with a solution of that salt, in the proportion of five grains to an ounce of water.

It sometimes happens that the ulcer is prevented from healing by the patient having used too much mercury. It becomes inflamed and painful, the granulations are of a dark colour, the discharge is thin and brown, and so acrimonious as to excoriate the surrounding skin. In this case the mercury should be instantly given up, the patient put upon a milk and vegetable diet, and the sore dressed with cold solutions of opium; or if the sore is prevented from healing by a debilitated state of habit, induced by the long continuance of mercury, it must also be given up, the nitric acid substituted in its stead, and the patient put upon a nourishing diet, with a moderate allowance of wine, bark, and cold bathing. We must remember, that it is by no means always necessary to keep the patient under mercury till the sore is healed. An ulcer arising from a bubo is in general long of healing, and we give up the mercury after the system has been for some time under its influence, and when the sore looks healthy.

CONSTITUTIONAL LUES.

When syphilitic matter has been absorbed from a chancre or ulcerated bubo, the system becomes more or less affected, and the effects of the poison manifest themselves in a variety of ways. Sometimes the system is affected early after the primary symptoms, as in a few weeks, and sometimes months and even years elapse before any symptom indicative of a constitutional disease appears. The softer and more vascular parts of the body are generally affected before the firmer parts, as the skin and mucous membranes before the bones or tendons. The first traits of a constitutional disease most commonly present themselves in the throat, nose, mouth, or skin, sometimes one, and sometimes another of these is attacked first, but the throat is most commonly first affected.

Venereal Affections of the Throat, Nose, and Mouth.

Ulceration here, as in every other structure, is always preceeded by inflammation; the throat is most commonly first affected, and if the inflammation is severe, it soon ulcerates, and the marked character of the ulcer at once declares its nature. But it frequently happens that the inflammation is slight, and then it is long before any ulceration appears. In this case the practitioner is apt to mistake the nature of the disease. The patient first complains of a difficulty of swallowing, which he thinks becomes worse towards evening, and which is therefore frequently attributed to a common cold. Upon inspection, the throat will be found to be slightly inflamed, the inflammation of a dark copper colour, not violent or strongly marked, and attended with but little pain. The pain is not near so acute as in sore throat arising from any other inflammation; there is rather more uneasiness than pain, or chiefly the sensation of a disagreeable heat. The uvula, the whole of the velum pendulum palati, and both tonsils are occasionally affected; but the seat of the disease is most commonly in one or both tonsils.

In proportion to the severity of the inflamation, ulceration sooner or later takes place. The ulcer is always foul, of a deep grey colour, with indurated and elevated edges, attended with little pain even in its advanced stages except upon swallowing, and always surrounded by a deep copper coloured inflammation, more or less strongly marked. Sometimes the ulcer remains long stationary, making little progress, and sometimes it encreases in size so rapidly, as, in a short time, to destroy the tonsils, uvula and velum, extending backwards till it reaches the epiglottis, which it also destroys so as to uncover the glottis, causing perpetual cough from the admission of the discharge into the larynx, and danger of suffocation upon swallowing food or drink.

Like every other species of ulceration, its progress is quicker or slower in proportion to the attendant inflammation. When the ulceration proceeds far, it is uniformly followed by deafness; this may arise from the membranous portion of the eustachian tube being destroyed by the ulcer, from the tube being choaked up by the encreased secretion, or thickening of its walls in consequence of the inflammation, or from adhesion of its sides, but more probably from the three former. As the tube is lined by a mucous membrane, and inflammation of mucous membranes is followed by ulceration, and not by adhesion.

Sometimes the venereal inflamation and ulceration attack the schneiderian membrane, and, extending to the bones and cartilages of the nose, produce great devastation. When the ulcer is situated upon the septum or inside of the wings of the nose, the secretion first forms a scab which the patient is apt to pick off from time to time, leaving a very tender surface; but the ulceration proceeding deeper, becomes more distinctly marked, having a foul grey surface with inflamed and indurated edges. Sometimes the ulceration makes its way through the cartilages, appearing upon the outside of the wings of the nose; sometimes a hole is eaten through the septum, or it is wholly destroyed, so that the cartilaginous part of the nose falls down and becomes distorted, and sometimes the bones are so completely carious, that they are discharged, the nose falls flat which greatly deforms the visage. On other occasions, the venereal inflammation attacks the schneiderian membrane, covering the upper spongy bones; from their possessing little internal circulation, they soon become carious, a fœtid discharge takes place both from the anterior and posterior nares, the bones and membranes are entirely consumed, leaving the sense of smell greatly diminished or altogether destroyed. When the lower spongy bone and nasal duct are involved in the ulceration, the passage of the tears into the nose is obstructed, and the patient is afflicted with perpetual and incurable weeping eye.

It frequently happens, that this venereal affection of the nose is much milder and slower in its progress than has been now described. The ulceration does not extend deep, at least not rapidly so; there is only a scab formed upon the septum or inside of the wings of the nose, which, upon being removed, leaves a tender surface, but which is immediately reproduced. This is sometimes accompanied by a discharge from the anterior and posterior nares, and this discharge is frequently so profuse, that the patient is much annoyed by its trickling down into the fauces; upon examination the matter is seen upon the posterior part of the throat, it hardens during the night, covering it with a crust or scab, which is removed in the morning with difficulty, and which leaves so tender a surface, that the patient feels a cutting pain upon inhaling the air through the nose.

When the mouth is attacked with venereal inflammation, its most common seat is the palate and tongue; when the palate ulcerates, and the ulceration extends to the bones, from their thin structure and want of internal circulation they are soon destroyed, and a hole is immediately formed communicating with the nose. Although the ulcer be healed, and the disease completely rooted out from the habit, the opening never closes up, but the vacancy requires to be supplied with an artificial palate, to prevent the food and drink from passing into the nose, and to preserve the tone of the voice.

Venereal Blotches, or Eruptions of the Skin.

The skin is sometimes affected as early as the throat, sometimes before it, but generally after it, although this affection is among the primary symptoms of constitutional lues. Venereal affections of the skin are of two kinds; 1*st*, Blotches, which are generally of a pale red colour, but sometimes of a brown copper colour, without pain, slightly itchy, and rarely exceeding the size of the finger nail. They are most common about the breast, abdomen, and shoulders; the cuticle covering them, cracks and separates, and can be rubbed off like bran; after a time they partly or wholly disappear, but are soon replaced by a new succession. These blotches pursue this course of disappearing and reappearing for a considerable time, without any tendency to ulceration; at last the skin becomes red and tender, it in a short time cracks and oozes out a matter which forms a scab; the scab at last separates leaving a distinct ulcer. *2dly*. The body is sometimes partially covered with a distinct pustular eruption, like the common pimple, which, after some time, dries and forms a crust like the small pox; this at last separates and leaves an ulcer.

The ulcer arising in consequence of these affections of the skin, possesses a peculiar character, and is called the secondary venereal ulcer; a particular description of which will be found in the chapter on ulcers.

Nodes and other advanced Symptoms.

When lues has been present for some time in the system, the bones become affected, the vital functions are deranged, and the very springs of life contaminated. In the advanced stages of lues, there always takes place considerable fever of the hectic type, attended with sunk and sallow countenance, general emaciation, and want of sleep. The patient complains of wandering pains through the body, which are apt to be confounded with rheumatism; like rheumatism, the pains are more acute when heated in bed or exposed to the action of a fire; but there is this characteristic distinction, that rheumatic pains are principally situated in the muscles and joints, while the venereal are fixed in the bones.

When the bones become affected, they wholly or partially inflame and swell. When the whole shaft of the bone inflames and swells, it most commonly dies, forming venereal necrosis, or the bone becomes so completely carious, as to break upon the slightest injury: in this confirmed state of lues, I have known a man fracture his thigh bone merely by turning himself in bed; when the bones partially inflame and swell, they form tumors called nodes.

Nodes may appear early in constitutional lues; but they always belong to the advanced stage of the disease, and mark a deep rooted constitutional affection. They most frequently occur in those bones which are thinly clothed with muscles, or which have no muscular covering at all, such as the bones of the cranium, particularly the parietal bones, the lower jaw, the clavicles, the sternum, the bones of the fore-arm towards the wrist, and the anterior part of the tibia. Nodes are always extremely painful, particularly during the night when the patient becomes warm in bed; they are also more painful when situated in the center of the long bones, from their hard and unyielding structure, and when the periosteum becomes much inflamed, upon the slightest pressure the pain is excruciating. The integuments covering a node are at first not affected, but remain of their natural colour; in process of time the skin becomes red, the tumor soft, with a distinct sense of fluctuation; the integuments ulcerate, and it discharges, not pure pus, but a glairy looking matter; the ulcer is very foul, and becomes a pure venereal sore; upon the introduction of a probe the bone is felt bare, generally carious, but sometimes only swelled. When a node is cured by the use of mercury, the tumor is seldom entirely dispersed, but there remains more or less swelling in proportion to the affection of the bone or periosteum; if the swelling has been in the bone, although the venereal inflammation be removed, the tumor never subsides; but if the swelling has arisen from the inflammation and thickening of the periosteum, it in a great measure disappears.

In the advanced stages of lues, independently of the affections of the bones, the disease often attacks the eye and ear. Sometimes gutta serena is suddenly produced from an affection of the optic nerve or retina; at other times the venereal inflammation, without being attended with much violence or pain, produces blindness, by rendering the cornea opake, and the humours of the eye turbid; when the venereal inflammation attacks the ear, the ossiculi often become carious and are discharged, or a suppuration takes place in the mastoid cells, which terminates in incurable deafness. There often occurs a scurfy desquamation at the roots of the hair, which is followed by the hair of the head, eye-brows, and other parts of the body falling off. In this stage of the disease, there is always hectic fever, with great marasmus, and even if the patient is cured, there often remains imbecility of mind, impotency of body, and all the marks of premature old age.

Treatment of Lues Venerea.

THE Profession have, from time to time, been amused with new medicines for the cure of syphilis; but the united experience of all practical writers has declared that mercury is the only medicine which can with safety be relied on. But although this be the opinion of that part of the Profession who write from experience and not from speculation, still they are by no means agreed with regard to the manner in which the mercury should be used. If the modus operandi of mercury in the cure of venereal were once ascertained, it would be easy to regulate the use of the medicine so as to procure with certainty the wished-for effect; but while its peculiar mode of operation is unknown, the practice of the Profession must differ materially with regard to its exhibition. Accordingly, we find that a number of practitioners of late years administer mercury in such small doses, as barely to affect the mouth or exhibit any marked influence on the system; while others push the medicine so far as to excite a high febrile action, and visibly increase the secretions. It appears to me that mercury cures lues more quickly and with greater certainty, when given in such quantities as visibly to quicken the pulse, raise a general inflammatory action, and gently increase the secretions; and that much less of the medicine is required to effect a cure when thrown in quickly than when exhibited slowly: I shall therefore continue to adhere to, and to recommend that practice which I have found to be the most successful.

When mercury is given in such small quantities as hardly to affect the mouth, the cure is neither so quick nor so certain as when the circulation is much accelerated. A secondary venereal sore, in general possesses little action; but whenever the mercury begins to quicken the pulse, the sore becomes more irritable and begins to heal. We stop the mercury when the mouth becomes sore; in a few days the action of the system abates, and the sore becomes stationary; we renew the use of the mercury, the febrile action recommences, and the sore again begins to cicatrize; so that, literally speaking, a venereal sore heals by starts, and quicker or slower in proportion as it is rendered irritable. But in conducting a course of mercury, our great care should be not to push the medicine too far; for if carried beyond a certain point, the system becomes so excited, and the ulcer is rendered so irritable, that instead of healing it inflames, becomes painful, and begins to spread, forming an ulcer of a new character, called the Mercurial Ulcer, which is nothing more nor less than an irritable ulcer produced by the action of mercury.

Mercury exerts its chief action on the circulating system, on the salivary glands, on the glandular system in general, and on the skin and mucous membranes; and when exhibited in any great quantity, immediately affects the mouth. Our great art, therefore, in the use of this medicine, is to raise a febrile action in the system, while we prevent the mercury as much as possible from affecting the mouth. The mercury is determined to the mouth by heat in every form; by keeping the room too warm, by sitting over the fire, by lying in bed, by hanging the head, and more especially by keeping the head warm, and the jaws covered with flannel. Although this is the general practice, it is evidently improper; a treatment quite contrary should be adopted; and instead of the patient being kept warm, he should be kept cool, he should remain out of bed as much as possible, sit in the erect posture, and not hang the head; the jaws should not only not be kept covered with flannel, but the neckcloth chould be taken off, and even the night-cap removed from the head, keeping it lightly covered with a silk handkerchief; little fire should be kept in the apartment even in winter, and the room freely ventilated by occasionally opening the windows, while the mouth is frequently washed with port wine and water, with a solution of alum, a decoction of bark, or any other astringent.

Mercury may be exhibited internally or externally, or both ways. When taken internally, it is apt to affect the bowels and produce diarrhœa and tenesmus. It is therefore preferable to exhibit it externally, chiefly by friction. A variety of preparations have been used; but I believe the best mercurial preparations for general use are the blue pill and blue ointment of the London and Edinburgh Pharmacopœia. These are generally applicable to every form of the disease, although there are some preparations which are better suited than others for effecting particular purposes: Thus, if there is a large ulcer in the throat or on the glans penis, which would be in danger of inducing considerable destruction of structure before the mercury took effect, it is proper to apply the medicine in that form, or to have recourse to those preparations which will soonest affect the system and check the progress of the disease. We find this to be best accomplished by fumigation. By means of a general fumigation, the system may be placed under the complete influence of mercury in the course of a few hours. Again, it is observed that in nodes and other affections of the bones, the progress of the disease is more readily arrested by the muriate of mercury than by any other preparation, although I do not conceive that in this climate it is the preparation best calculated to effect a permanent cure.

In venereal ulcers of the throat and nose, as the ulcer is situated in a part where the destruction of structure may be attended with serious consequences, it will be advisable to place the system as speedily as possible under the complete influence of the mercury. For this purpose, from two drachms to half an ounce of strong mercurial ointment should be well rubbed into the surface of the body, for half an hour evening and morning, till the pulse rises, and the system bears evident marks of general excitement. When mercury is used by way of friction, it is generally rubbed upon the inside of the thighs, but its operation will be more speedy according to the extent of surface to which it is applied; it should therefore also be rubbed upon the legs, arms, and trunk of the body. If the ulcer is making rapid progress, or if the mercury applied by friction does not soon affect the system; it will be advisable to have recourse to fumigation, which will be found to operate more speedily than any other way in which mercury can be used. Various apparatus have been contrived for conducting fumigation, but the most simple way, and which can always be commanded, is to strip the patient naked in a room of an agreeable temperature, and then to place him in an armed chair, surrounded with a blanket, so as to retain the fumes in contact with the surface of the body, and prevent them from entering the lungs. We then gradually sprinkle, by means of a knife or spathula, two or three drachms of the red or black sulphuret of mercury upon a heated plate of iron placed under the patient. The mercury is instantly volatilized, the fumes rise, and, being retained by the blanket, are applied to the surface of the body, with which they must be kept in contact for some time.

After the fumigation is completed, the patient should be enveloped in flannel and conveyed to bed. In the course of a few hours, the system is in general visibly affected by the mercury; if not, the fumigation must be repeated every eight or ten hours till this is effected. As soon as the system is affected, the farther progress of the disease is arrested, and by keeping up the action produced by the mercury, any ulcer in general soon heals.

As venereal ulcers in the throat are always more or less foul, the throat should be well washed five or six times a-day with a gargle, composed of one grain of the muriate of mercury to five or six ounces of water; or if the ulcer is in the nose, it may be dressed by means of a hair-pencil with the red oxide of mercury combined with resinous ointment. This local treatment should be pursued till the ulcer is clean and in a healing state; and although no precise rule can be laid down with regard to the length of time the patient should be kept under the influence of mercury, still the medicine should be continued for some time after every symptom of the disease has disappeared. If the healing of the ulcer has not been accelerated by local applications, it will not be necessary to continue the mercury so long as when the sore has been healed by caustic or stimulating dressings. At all events, it should be continued with visible marks of its operation upon the system for a fortnight or three weeks after the sores are healed.

In the management of venereal blotches, no local remedies seem necessary. All that is required is a well-conducted course of mercury; its operations on the system should be very perceptible; and to ensure future safety, it should be continued for a sufficient length of time after every spot has disappeared. The mercury may be used by way of friction, which may be occasionally changed for small doses of the muriate of mercury, combined with the compound decoction of sarsaparilla, which will be found to be a valuable auxiliary in the cure of venereal affections of the skin.

In the advanced stages of the disease, when the bones are affected, it will be necessary to continue the mercury for a great length of time to ensure a permanent cure; and here I have observed that material advantage is derived by changing the preparation from time to time; for when a venereal sore or node becomes stationary, or its cure proceeds slowly under the operation of one mercurial preparation, it frequently heals rapidly, and the patient speedily recovers by subjecting him to the action of another preparation of this mineral. The muriate of mercury has a more salutary effect in this stage of the disease than any other preparation. It may therefore be advisable to begin with small doses of this salt, and continue its use till such time as the violence of the symptoms subsides. From the noxious operation of the muriate of mercury on the stomach and bowels, it should always be exhibited in small doses, largely diluted, and frequently repeated. I am in the habit of dissolving one grain of the salt in an ounce of water, and desiring the patient to take thirty drops of the solution (which contains only the sixteenth of a grain) in a small tumbler, of the compound decoction of sarsaparilla four times a-day; even this small dose frequently produces nausea and griping, which must be counteracted by small doses of opium.

After the muriate of mercury has arrested the progress of the disease, which it in general soon does, its farther use may be laid aside, and frictions with mercurial ointment substituted in its place, or the blue pill may be administered along with the ointment. * This course must be con-

---

* The French surgeons in general, and Cullerier in particular, almost exclusively employ the muriate of mercury in the cure of syphilis. At L'Hôpital De Veneriens, under the superintendance of Cullerier, and the only public establishment in Paris for the reception of venereal cases, the muriate of mercury is used in all stages of the disease; in cases of recent infection as well as in those of constitutional confirmation and long standing. At this Hospital, it is always exhibited in solution in the form of Van Swieten's liquor. They dissolve eight grains of the salt in thirty-two ounces of distilled water,

tinued for some time after every symptom of the disease has disappeared; and during the whole progress of the cure, the system must bear evident marks of the operation of the mercury, taking care not to keep up the action too long, or to carry the excitement too far, as we are in danger of inducing so much irritation as to produce the mercurial disease. If the patient is therefore much reduced, or if there is great febrile irritation, it will be advisable to suspend the mercury for three weeks or a month, till he completely recovers from its effects, using in the interval the compound decoction of sarsaparilla or the nitrous acid. When the action of the

---

of this solution each ounce contains one-fourth of a grain of the sublimate. The ordinary dose is two ounces, containing half a grain, and this they always administer once in the twenty-four hours at the morning visit. They generally begin with one ounce of the liquor, containing one-fourth of a grain. Next morning they increase it one-fourth part, and the third day they give the full dose of two ounces. To prevent the occurrence of cholic pains which it is apt to excite, they dilute it with four or five ounces of barley-water, linseed-tea, or some other ptisan. In Hospital practice, they give the whole quantity allotted for the twenty-four hours in one dose; and they assign as the reason for this, that they are then sure of its being taken, as it is administered in the presence of the surgeon. But they admit that it is preferable to give one half in the morning and the other half in the evening, or even to subdivide it into smaller doses, and give it still more frequently.

mercury has subsided, and the patient is somewhat recruited, we again place him under a mercurial course of a shorter duration, as in the advanced stages of the disease it is only by a long continuance of the mercury that a permanent cure can be effected.

On Mercury, with its Modus Operandi in the Cure of Syphilis.

SHORTLY after the introduction of the venereal disease into Europe, mercury was resorted to for its cure, since which time the use of this remedy has never been wholly abandoned. Mercury has been employed with various views; sometimes it has been administered so timidly as to fail in effecting a permanent cure; at other times, in such large quantities as to induce violent salivation, and produce a disease as distressing and fatal as that for which it was administered. The abuse of this medicine occasionally brought it into disrepute, and led practitioners at different periods of time to propose the substitution of new remedies and new modes of treatment for the cure of lues. But all other medicines have been found inferior to mercury; and when prudently administered, so sure and certain is its salutary operation in this disease, that the experience of three centuries justifies us in assigning to it the character of a specific.

Oxidized mercury, when exhibited in large quantities, acts as a universal stimulant; it encreases the force of the heart and arteries, multiplies the number of arterial contractions, and so disturbs the function of nutrition, that the buffy coat is found on blood that is abstracted. It moreover produces headache, hurried respiration, general heat, restlessness, thirst, and other symptoms of inflammatory fever, and so powerful is the action upon the brain when long continued, that it not unfrequently induces madness, but independently of this general excitement of the vascular system, mercury has a marked effect upon the whole lymphatic system, and the mucous membranes. It excites the salivary glands and mucous surfaces to such a degree, as to produce first an encreased secretion, then inflammation, and if this encreased excitement be long continued, the inflammation terminates in ulceration and not unfrequently in gangrene: besides these local effects, the long continued use of mercury sometimes produces a high febrile action, with a general irritability of habit, which cannot be subdued, and terminates in death; these are the effects of mercury on the general system, but its peculiar mode of operation in syphilis, has not been so well ascertained.

Since the first introduction of it for the cure of this disease in the year 1497, various hypotheses have been given to the world, in explanation of that peculiar mode of action to which it owed its efficacy. The most respectable of these hypotheses, and indeed the only ones worthy of notice, as at all consistent with the laws of the animal economy, are three, viz. that mercury acts as an evacuant, that it acts as a chemical antidote, and that it cures by its stimulating powers.

When mercury was first used for the cure of syphilis, it was always exhibited in very large doses, and then its most marked operation on the system, was that of exciting a profuse salivation. Under those circumstances it cured the disease, which naturally led to the conclusion, that it operated as an evacuant; Dr Freind was so fully persuaded of this, that he imagined it was impossible to cure a confirmed pox without exciting a salivation, and that the more profuse the salivary discharge was, the cure must be the more speedy and certain. Those who have ascribed the salutary effects of mercury in lues to its evacuant power, have believed, that it operated chiefly by encreasing the flow of saliva, sweat, and urine. This opinion prevailed for a great length of time, but of late has been much on the decline in this country: a few years ago, the same doctrine was revived by some North American physicians, particularly by Dr Francis of New York, who imagines that the curative action of mercury, depends upon promoting an encreased discharge from the excretory vessels of the whole system, and "principally upon its operation on the exhalent vessels of the skin."

That this metal does not act upon the principle of an evacuant through the medium of the salivary glands, is manifest from this circumstance, that salivation is not necessary to the cure of the disease. Dr Locher of Vienna, betwixt the years 1754 and 1762, cured 4880 patients by the muriate of mercury alone, and without inducing salivation. Colombier, cured by the same medicine in the French military hospitals, 900 patients; this salt is the least apt of all the mercurial preparations, to excite salivation, it was the favourite preparation of Van Swieten. Cullerier, and other practitioners employ it for their daily prescription, and cure lues in all its stages, without any marked operation on the salivary glands; salivation in fact, so far from promoting the cure of syphilis retards it; and when the pulse rises under the operation of mercury, and the mouth becomes affected, if profuse salivation succeeds, it diminishes the febrile action, and lessens the power of the medicine, which on the contrary becomes efficacious in proportion as we repress the salivation. That mercury does not act as an evacuant by the exhalent vessels of the skin, is proved by antimonials, and other diaphoretics, however long continued, failing to cure the disease: that it does not act as an evacuant by the kidney, appears from digitalis, squill, and other powerful diuretics not effecting a cure: and lastly, that it does not act upon the principle of an evacuant by the bowels, is ascertained from the disease being incurable even by the most drastic purges. It therefore appears, that the curative operation of mercury in syphilis, is not purely upon the principle of an evacuant.

That mercury acts chemically neutralizing the venereal poison, or as an antidote, has long been a prevailing opinion. This doctrine was particularly espoused by Mr B. Bell; but if this were the case, it would follow, that in all patients labouring under similar states of the disease, the same quantity of mercury would be required to effect a cure, which is not the case, the quantity requisite varying according to the age, climate, or peculiarity of constitution; while again, the longer the course was continued, and the less the system was disturbed under its operation, the more certain would the cure be, which is contradicted by experience. The great quantity of some preparations, which is requisite to cure the disease, compared to that of others, also shews, that mercury does not act as an antidote: when the system has been long accustomed to the operation of mercury, it loses its effects over the disease, which is another proof that it does not act chemically. Mr Bell lays great stress upon the experiment of rubbing mercury with the venereal virus, rendering it inert, and incapable of infecting; it appears to me, that this does not depend upon any chemical union, but simply upon dilution. Triturating venereal poison with any substance will render it inert, provided it be added in sufficient quantity; at all events, any union of this kind out of the body, cannot be received as a proof that the same process would follow, in the vessels of the living system; neither can the local action of mercury in the cure of venereal sores, be ascribed to its operation as an antidote; but rather to its stimulant powers, as these sores are as readily healed by the preparations of copper, and other caustics as by mercury. Mr Bell seems to think, that the speedy manner in which mercury arrests the progress of a bubo, when applied to the thigh by friction, so as to bring it in immediate contact with the inflamed gland, is a decided proof that it acts as an antidote neutralizing the poison, and rendering it inert; but if the considerations advanced in a preceeding part of this work have any validity, a bubo does not arise from the absorption of venereal matter, but from the inflammation extending along the lymphatics; and mercury in discussing the bubo, must act upon some other principle than that of an antidote: as a farther proof that mercury does not act as an antidote, or that its virtues do not depend upon the metal; other medicines cure as well as mercury, especially in warm climates, such as the nitrous acid, the muriate of gold, ammonia, sarsaparilla, guaiac, and some others.

The third hypothesis which ascribes the curative action of mercury to its stimulant powers, seems the most tenable of all; although I must admit, that there are also objections against this theory.

That this is in reality the case, seems highly probable from the following considerations; the first and most conspicuous operation of mercury on the system, is that of a stimulant, and this operation must always precede its evacuant powers, because these evacuations can only occur in consequence of encreased excitement in the organs, from which the evacuation takes place; the stimulant effect of mercury is necessary to its success, for unless it quickens the pulse, and exhibits other marks of a stimulant operation, it rarely effects a cure; but to attain this end, it is not necessary that it should encrease the salivary or other secretions in any marked degree. All the other medicines which have been found serviceable in lues, operate in a manner analogous to mercury; they first stimulate before they encrease the secretions, and their efficacy seems to bear a proportion to their stimulant power; whatever encreases the vascular actions of the system for a time, checks the progress of lues, as an attack of inflammatory fever or mania. In the autumn and winter of 1817, I had under my care a young man who became suddenly maniacal at the time he was under the operation of mercury, for the cure of constitutional lues. He had an ulcer in his throat, another on his left cheek, blotches over his whole body, one node on the upper part of the right ulna, another on the same bone near the wrist, and another on the right foot, all painful, and acutely sensible to the touch; when he became maniacal, the system was not suffering much from the mercury, the pulse was about 100, and the mouth but slightly affected; the mercury was immediately given up, the mouth in a few days became quite well, the ulcer in the throat healed, as well as that on the cheek, the blotches all disappeared, the mania continued unabated for ten weeks, during the whole of which time, he was so high as to require strong coercion, the pulse always upwards of 100. About a fortnight after the commencement of the mania, the nodes became much less painful, gradually decreased, and in seven weeks completely disappeared; but the cure was not permanent, for in proportion as the maniacal excitement abated, the venereal symptoms returned, the pulse fell to 80, the eruptions on the skin were renewed, the nodes reappeared, and the scalp broke out in large ulcers, discharging a profuse fœtid matter. I watched the case most minutely, and I am convinced that the venereal symptoms disappeared, not from the operation of the mercury, but from the influence of the high excitement attendant on the maniacal state.

If the curative action of mercury depended on its stimulant power, it may be asked, why do not ardent spirits and some other stimulants cure the venereal, as readily as mercury. I apprehend, that this may be satisfactorily explained upon the principle of ardent spirits, possessing in combination with their stimulant power, a deleterious or narcotic effect upon the nervous system. I conceive that all those medicines which are purely stimulating, will be found more or less to arrest the progress of syphilis, while those which combine a narcotic with a stimulant power, will prove inefficacious, as they exert a deleterious influence upon the brain, and thus poison the fountain of nervous energy.

Upon taking a review of these three hypotheses, respecting the curative action of mercury in syphilis, it appears to me, that the general mass of facts is more reconcileable with its action as a stimulant, than either with that of an evacuant or a chemical antidote.

SECTION III.

CANCER.

From the earliest records of Surgery down to the present day, every book abounds with ample histories of Cancer; but although the most eminent practitioners, and the men most distinguished for talent and observation, have directed their attention to investigate the causes, and ascertain the nature and treatment of this disease, still we are very far from knowing any thing of its real nature, and have not yet discovered any medicine capable of effecting a radical cure. The Profession are not yet agreed whether cancer be a constitutional or a local disease. Although the general opinion of the medical writers of the present day arranges cancer amongst local diseases, yet some celebrated practitioners are of a different opinion, and the results of practice would frequently lead us to believe, that that species of cancer which follows spontaneous scirrhus is not entirely local.

Cancer is justly considered as one of the most dreadful maladies that can afflict human nature.—Cheered by no ray of hope, and doomed to pass a miserable existence, the unhappy patient must either submit to a cruel, and sometimes unavailing operation, or sink under the anguish of a loathsome disease. Glandular structure and mucous membrane are the general seat of cancer, but no part of the body is exempt from its attacks. It assails every sex and every age, and is the only disease, except *Fungus Hematodes*, that involves in its ravages, skin, cellular substance, glands, muscles, bones, and every kind of structure. We daily see it appearing in all the soft and spongy parts of the body, as the gums, lips, nose, cheeks, abdomen, and thighs. However, there are some parts of the human structure more than others, where its attacks are apparently regulated by age and sex. Thus the breast and uterus are most frequently the seat of this disease in the female, the glans penis, testicles, and lower lip in man, and the eye in infancy. The skin of the face, the rectum, the bladder and the tongue, seem to be equally susceptible of attack in both sexes.

Cancer most frequently occurs in the female breast, and then is generally a disease of advanced life, although I have extirpated the mamma in a well marked case of cancer at the age of twenty-four; the disease returned, and the patient died a horrid death. I have also seen it extirpated for this disease at the age of sixteen, and the examination of the structure justified the operation; still it is a disease more frequent in the decline of life, chiefly occurring after the fortieth year. In this, as in every other glandular part, it is always preceded by scirrhus.

The next most frequent seat of the disease is the uterus, and when this organ is affected, it occurs most frequently betwixt the fortieth and fiftieth year, when its actions become irregular. It attacks married women as often in proportion as virgins, and women who have born children as frequently as those who have never been impregnated. It generally begins in the neck of the uterus, and like the disease in all other parts does not confine itself to the organ in which it first began, but soon involves the neighbouring structure. This destruction of structure frequently takes place to such a degree as to destroy the bladder and rectum, permitting their contents to be perpetually discharged. After the mamma and uterus, the lower lip is the most frequent seat of the disease, then perhaps the testicle, rectum, and glans penis, but these three last are rarely affected, when compared to the three former; and from the disease appearing more frequently in the female breast than in all the other structures of the body put together, it is obvious that cancer is a disease more peculiar to the female than the male.

As cancer occurs more frequently in the female breast, and as all its stages in that structure are very distinctly marked, in our remarks on the disease, we shall particularly allude to it. Cancer may arise either from an internal or external cause; that which arises from an internal one, or that which occurs without any evident external exciting cause, is the most dangerous form of the disease. It spontaneously occurs betwixt the fortieth and fiftieth year, about the cessation of the menses. Lassus remarks, that women who are very fat, that those who have fair hair, a fine skin, the pale and livid complexion, are more disposed to cancer than other women. Again, Sabbatier says, that women who have a fine complexion, and are of a sanguine constitution, are more frequently attacked than others, and also those who are peculiarly subject to rheumatism.

I have not observed that any particular complexion or habit of body predisposes to cancer more than others; but it is most certain, that women who are sterile, and who have led a life of celibacy, are more frequently attacked than those who have born and suckled children. This seems to depend upon the mammary gland, in the former not having been exposed to those occasional excitements which attend the parturient state, consequently the structure is more delicate, and more ready to become diseased, when the action falls upon the gland at the cessation of the menses, or from a blow; than in those where the gland has secreted milk, and has been exposed to handling and occasional excitements.

Scirrhus of the mamma is at first round and moveable, and can be felt rolling under the skin; it then changes its figure, by losing its globular form; it becomes longer, more irregular and knotty to the feel; it increases greatly in size, and when it degenerates into cancer, grows more or less painful. The pain is sometimes acute, and sometimes dull; sometimes it is attended with throbbing, but most commonly with a burning and prickling heat, as if needles and pins were sunk into the substance of the gland.

These lancinating pains are more acute, and more especially felt upon the changes of the weather, after violent exercise, when the patient has been much excited by the passions of the mind, upon handling or compressing the mamma, and at the accession of the menstrual period from the general excitement which at that time takes place in the system. This constitutes the first stage of occult cancer. It may be denominated *Incipient*

Carcinoma, and is just scirrhus attended with a peculiar pain.

The tumor now grows very remarkably; that which in its commencement was no larger than a pea, has now acquired the size of a pigeon's or hen's egg; and in proportion as it has increased in size, it has become more knotty and irregular on its surface; the lancinating pains are more frequent and more acute; and it is worthy of remark, that the more painful the tumor the more rapid the progress of the disease; the less pain that accompanies it, the more stationary the cancer; its progress is also always more rapid during pregnancy, and in early than in advanced life. The tumor frequently soon adheres to the skin, but sometimes it does not adhere till about to ulcerate; the integuments become puckered, and of a livid or ash colour; the nipple is often drawn inwards; and when this is the case, it always marks an inveterate disease. The obstruction and obliteration of the veins within the tumor cause those on its surface to swell and become distended, with a bluish or dark-coloured blood; and these veins extending in all directions, somewhat resemble the claws of the cancer or sea-crab; hence the name of the disease. This then constitutes the second stage of ocult cancer, and may be denominated *Confirmed Carcinoma*. The decided characteristic marks, then, of confirmed ocult cancer, are a tumor, hard, irregular, and knotty on its surface, generally adhering to the integuments above, and frequently to the muscle beneath, attended with sharp lancinating pain, a livid or ash-coloured appearance of the skin, and a distended and bluish state of the subcutaneous veins.

The disease continues to increase, the angles of the tumor become more pointed; there is an accession of pain, pulsation, and unusual pricking, with an increase of heat and swelling. In this advanced stage, and frequently long before ulceration, we often perceive, upon examining the structure after extirpation, small cavities in the centre of the tumor, sometimes containing pus, sometimes a greenish and sometimes a bloody sanies. The skin begins to crack; a corrosive sanies or fœtid ichor issues from the fissures, which excites a burning itching and great excoriation. The disease has now degenerated into open cancer. When the skin has once cracked the ulcerating process advances with a wonderful rapidity; the cracks go on augmenting, and, being no longer confined to the skin, they reach the substance of the gland; the discharge, sometimes a black fœtid ichor and sometimes bloody, now flows in greater quantity; the cruel and burning pains become more poignant; the cancer is now a horrible sordid ulcer, with tumified and reverted edges, sometimes discharging blood profusely from the eroded vessels, and sending forth a very offensive and peculiar smell, emitting ammonia like other parts which have been deprived of the principle of life, and become gangrenous. The hemorrhagy, when it occurs often and is profuse, greatly weakens the patient, but it is always followed by a considerable abatement of the pain; hard fungous excrescences, of a cauliflower form, spring up on all sides from the bottom of the ulcer, making its surface full of inequalities, and the surrounding integuments having assumed the diseased action, become hard, and of a violacious colour. Sometimes when one breast is nearly destroyed, or far advanced in its progress to destruction, the other becomes scirrhous, soon degenerates into occult cancer, and even ulcerates.

Whilst all this destructive process is going on, the disease sooner or later extends to the axillary glands, by the inflammation spreading along the lymphatics, or by absorption; the glands in the axilla become swelled, hard, and painful; in the latter stages, those above the clavicle are affected, also the others situated at the top of the chest, and even the lymphatic glands within the thorax; from the pressure of the enlarged axillary glands upon the lymphatics and nerves, the arm swells, and the fore-arm and fingers become numb and powerless.

The unhappy patient now finds no rest either day or night, and it is only by large doses of opium and other narcotics, that she can mitigate her distracted feelings, and, for a while, support a miserable existence. However the pain and irritation encreasing, with cough, difficulty of breathing, pains like rheumatism throughout the whole body, and sometimes very acute and fixed in the spine, accompanied by hectic fever and a sunk and yellow countenance, she dies in the utmost misery and amidst the most cruel tortures.

Although we frequently meet with patients afflicted with cancer, whose mothers have laboured under or died of the disease; still the general result of practice does not entitle us to rank it as a hereditary disease, neither does it appear to be infectious. Nooth and others have inoculated themselves with cancerous virus without producing the disease, and we frequently observe, that men have intercourse with their wives even in advanced stages of cancer of the womb, without receiving any contamination.

But the great and important question for consideration, and indeed the only one of practical utility is, Whether cancer be a local or a constitutional disease? if local, although the cancer has made considerable progress, and has even ulcerated, it should be removed by operation, agreeably to the practice of Messrs Hill and Benj. Bell; while on the other hand, if constitutional, we will be naturally led to adopt the opinions of Houppeville and Dr Monro the grandfather, who were against operation, alledging, that in the majority of cases, the disease seldom failed to return in a more aggravated form.

There are several circumstances which would lead us to believe that cancer is not purely a local disease, and among others we may remark, that various parts are often affected at the same time, or if the cancerous structure be removed by operation, the disease frequently does not return in its original seat, but in some other part; thus, after the extirpation of one mamma, we not unfrequently see the disease reappearing in the other or in the uterus. Local injury producing cancer is by no means a proof that it is a local disease; for the local injury might not produce it unless there previously existed a constitutional predisposition, which the injury calls into action. If I were to speak from my own experience, I should say that there are two forms of the disease; one occurring at all periods of life from a blow, and the other appearing spontaneously about the forty-fifth or fiftieth year at the cessation of the menses. In the former the disease is slow in its progress, and we operate with various success; but if taken early, there is generally no return; whereas in the latter, the disease is rapid in its progress, and often returns after operation. Upon taking a review of those cases in which I have been concerned, where I have assisted Mr John Bell, or operated myself, and which now amount to a considerable number, I find that in spontaneous cancer occurring in the female breast about the forty-fifth year, at the cessation of the menses, the disease, after operation, has returned in its original seat, or in some other part, in at least two thirds of the patients who have been operated upon, although the cancer was by no means in an advanced stage when the operation was performed. This statement is unfavourable to the operation, and leads me to adopt the opinions of Houppeville and Dr Monro.

TREATMENT OF CANCER.

The treatment of cancer may be divided into the Medical and Surgical treatment; the former embracing medicine, diet, and the regulation of the general system; and the latter including three distinct modes of procedure, either tending to remove the affected organ, or to destroy the structure in which the diseased action is situated; the first of these is effected by the ligature or the knife, and the latter by the actual cautery, arsenical, and other caustic preparations, or by inducing artificial gangrene, and by compression: on each of these modes of treatment, I shall offer a few observations.

MEDICAL TREATMENT.

From the frequent occurrence of cancer, and from the intractable nature of the disease, there has always prevailed a great desire to discover some specific, or invent some mode of treatment which might lead to a radical cure. Various external and internal remedies have at different times been proposed, some have even boasted of the name of specifics; but practitioners are now generally agreed that no reliance is to be placed on them. The internal remedies have been used in all stages of the disease, and consist of various narcotics, and some acrid metalic salts, so frequently used in those diseases which are desperate, and for which we know no method of cure. The narcotics are conium maculatum, belladona, solanum dulcamara, hyoscyamus, and opium. Of these medicines, conium maculatum has been most frequently used; but none of them effect any change on the disease, and only when used in liberal doses act on the general principle of narcotics, allaying pain and irritation.

The metallic preparations are arsenic, mercury, and iron. Arsenic was the favourite remedy of Justamond, and which he conceived to be a specific for cancer; mercury gives some alleviation in scirrhus and occult cancer, as in other glandular affections, when used in such small doses as not to increase the vascular actions of the system, but unfortunately aggravates the symptoms when in the state of ulceration, particularly when exhibited in such quantities as to quicken the pulse. Various preparations of iron were some years ago recommended to the attention of practitioners, by Mr Carmichael of Dublin; I have frequently tried them, but with no advantage; I can readily conceive the great utility of iron in scrophulous affections of the breast, but am at a loss to explain its modus operandi in the cure of cancer; from its great tonic power, it ought to redden the blood, quicken the pulse, and encrease vascular action, which, from what we know of the nature of cancer, should aggravate the disease.

The external remedies are generally used in the ulcerated stage of the disease, and consist of palliative applications, which allay pain and correct the fetor of the discharge; but they possess no efficacy in curing the disease: they also comprehend various caustics. The former include watery solutions of opium, the bruised leaves of the conium maculatum, scraped carrots, or the carrot poultice, the fermenting poultice, powdered charcoal, chalk finely levigated, carbonic acid gas, liquid tar, and tar water; the caustic applications are arsenic, and the muriate of mercury. Arsenic, as we remarked above, was considered as a specific by Justamond, and formed the basis of the remedies of Plunket, and of Guy in England, and of the celebrated applications of Chonet and Rousselot in France; the muriate of mercury possesses no virtues over any other caustic, and it, as well as arsenic, always excites much pain and irritation.

These, then, are the various topical and internal remedies, which have been at different times used for the cure of cancer; each have had their abettors; their reputation has had but a short lived existence; and melancholy experience has taught us, that no reliance is to be placed upon them.

Although no medicine with which we are acquainted can cure this disease, a well regulated regimen, combined with frequent local bleeding, has often been of great utility. Milk and vegetables, or rather the spare and low diet recommended by Pouteau and the Danish surgeon Callissen, and afterwards adopted in England by Messrs Fearon and Pearson, has been of more service in arresting the progress of cancer than any medicine that has ever been proposed; but it should be employed early, as soon as the scirrhus has taken on the inflammatory action. All wine, spirits, fermented liquors, animal food, violent exercise, or whatever has a tendency to quicken the pulse, must be rigidly avoided; while every thing which can tend to lessen the force of the general circulation must be adopted. The diet should consist principally of vegetables, ripe fruits, stewed or roasted, very weak soups with bread, and for drink, nothing stronger than water. This practice, conjoined with rest, frequent topical bleedings with leeches and purgatives, especially of the saline class, with warm opiate fomentations, will be found to be of infinite service in the early stages of the disease. It has frequently allayed the pain, reduced the swelling, and apparently checked the disease in its incipient state; but, should this not be the case, and the disease evidently encreasing, or even stationary, the most early recourse must be had to the operation as the only expedient yet known to us which affords any prospect of success.

SURGICAL TREATMENT.

1st, THE LIGATURE.—In the removal of diseased structure, the ligature is not only more tedious but ultimately attended with more pain than the knife; we never think of employing it except in situations where the knife cannot be used with safety, or where the operation by the knife is attended with horror, as in the removal of cancerous portions of the tongue. When cancer attacks the tongue, it generally begins near the point, and the diseased portion may be safely removed by ligature: we take a large surgical needle armed with a ligature, and strike it through the centre of the tongue near its point, we then split the ligature, and tie one portion on one side and the other portion on the opposite side; the operation is not attended with much pain, the included portion fades under the ligature like a polypus, and soon drops off. This operation should always be done early; if the glands under the jaw are affected, on no account should it be attempted, because the swelling of these glands implies that the inflammation has either extended along the lymphatics to the glands, or that they are poisoned by absorption, in which case the removal of the diseased portion of the tongue will not cure the disease, but the glands will soon become more inflamed, ulcerate, and terminate in a cancerous sore.

2nd, THE KNIFE.—The removal of the cancerous structure by the knife, is undoubtedly the preferable operation; it is done at once, produces less pain, less constitutional irritation, and, upon the whole, less suffering; while there is a greater chance of removing all the diseased parts, than by any other method with which we are acquainted.

Although, in every operation, it is a general rule to save as much of the integuments as possible, in order to cover neatly and effectually the wounded parts, this rule should be less regarded in the excision of cancer, particularly that of the mamma, than it usually is. The skin on the sides is so loose and moveable, and so easily stretched, that their could be little difficulty in bringing the cut edges together, even if the surgeon were in every instance to cut the skin away nearly to the whole extent of the tumor.

It is always adviseable to perform the operation before the parts ulcerate, and all the diseased structure should be cleanly and fairly cut out: with this view, the surgeon, previous to attempting any operation, should deliberately and minutely examine the state of the lymphatic glands in the axilla, and all along that fatty line, under the inner edge of the great pectoral muscle, stretching from the mammary gland to the arm pit, for no cancerous parts should be attempted to be cut out, unless the surgeon also removes all the diseased absorbent glands, as the disease will inevitably return: when this is the case cancer makes much more rapid progress, than if no operation had been performed. I once saw a mamma extirpated in a stout fat woman where a small gland could be felt in the arm pit, but as the gland was hardly perceptible, so much so, that some of the surgeons could not feel it; as it did not seem to be very hard, and quite free of pain, it was not judged necessary to remove it; however, in twelve months after the operation, this gland became as large as a wall-nut, and so extremely painful, that she could get no rest either night or day; it at last ulcerated, and when she came to me, there was a large, hard, foul, ulcerated tumor, surrounded with diseased skin in the arm-pit; however, it might still have been safely cut out, had I not been deterred from the operation by a large swelled gland lying in the root of the neck above the collar bone.

Although the glands lying in the axilla, and betwixt it and the breast, be hardened and much diseased, the surgeon may proceed in his operation, as they can be very easily dissected out; but where he feels the glands above the collar bone diseased, or when his patient is affected with cough, difficulty of breathing, pains throughout the body, particularly severe in the spine or with scirrhous liver, as these are the constitutional marks of cancer, he must abandon his enterprize, and confine himself entirely to palliative remedies, for any operation under these deplorable circumstances would only hasten the death of the patient. Where the operation is admissible, the surgeon should in every instance remove the whole breast, even although only one of the glands is affected, as leaving any part might endanger a relapse, and could be of no use to the patient.

3d, The Actual Cautery.—The actual cautery was the most ancient way of curing cancer; for obvious reasons, it is far inferior to the knife, but is much preferable to any potential cautery. It is really mild in its application, gives little pain, acts entirely locally, and produces no more constitutional irritation than what arises from a burn; it therefore possesses a decided superiority over the caustic pastes, which are apt to be absorbed, and produce great constitutional irritation. The actual cautery is altogether adapted to the ulcerated stage of cancer, and cases do frequently present themselves where we are obliged to have recourse to this procedure. It is a safe application, although little used by surgeons; has no cruelty but in the name; and I should be inclined to prefer it in every instance where the knife ~~wa~~is inadmissible, as when the cancer is situated in the face or palate, or has proceeded to a very great length in the breast.

4th, The Potential Cautery.—The potential cautery embraces the various caustic pastes which have been chiefly used by empyrics. They have in general arsenic for their basis; they always excite great pain and great constitutional irritation; and from the deleterious materials of which they are composed being absorbed, the patient is sometimes as effectually poisoned as if arsenic ha been taken by the mouth. I therefore conceive the caustic pastes to be dangerous and precarious remedies; for, independently of the danger attending their use, they are attended with a great deal more pain, and are much more uncertain in their operation than either the knife or the actual cautery. When arsenic is used for the destruction of the cancerous structure, it requires to be combined with the tartarate of antimony, ranunculus acris, or some other escharotic, or its application to be preceded by some other caustic to destroy the cuticle, as arsenic does not act on that structure. I shall offer some more particular observations on arsenical applications when we come to treat of cancerous ulcer.

5th, Artificial Gangrene.—The destruction of the structure in which the disease is situated, is generally effected by cauteries or caustics; but "it has been observed in cancer of the mamma, that from a blow, or other exciting cause, an active inflammation has sometimes supervened, which, terminating in gangrene, has so completely involved the cancerous parts, that when the slough has separated, the disease has been completely removed, leaving a healthy ulcerated surface, which has granulated fast, and in a short time cicatrized." Observing this spontaneous gangrene and natural separation, Rigal and Garneri in France have proposed as a substitute for the operation in the cancerous mamma, to produce gangrene by inoculation; and this has actually been done by making a small incision in the centre of the breast, and inserting into this incision a small bit of lint dipped in gangrenous sanies.

Garneri relates, that a woman, fifty-nine years of age had in the left breast a very large open cancer, the base of which extended to the axilla. In consequence of a peculiar treatment, there took place a violent inflammation, followed by gangrene and a putrid ulcer, which, after separation of the gangrened parts, cicatrized; the patient recovered her health, but three years after died of a putrid fever. Richerand says, that a woman about forty-eight years of age, of a good constitution, presented herself at the Hospital of St Louis, with a very large cancerous tumor situated in her right breast. This hard mass became soft; inflammation and gangrene succeeded, which separated it from the skin and surrounding cellular substance. The separation of the eschar freed the breast from the diseased mass, leaving only a healthy ulcer, which cicatrized completely in less than two months.

Le Dran has also seen a tumor of the same character separated in the same manner, viz. by inflammation and gangrene.

In the year 1791, Rigal conceived the idea, founded upon the preceding observations, of curing cancer by producing gangrene; and in 1810, Garneri, chief surgeon to the Hospital of La Charitè at Turin, adopted the same sentiments, founded upon the observations which he had published. M. Rigal is said to have tried many experiments which have succeeded, the most remarkable of which is the following:

"A lady, about thirty-seven years of age, of an irritable habit, was afflicted for many years with enlarged glands in the breast. After the trial of many useless remedies, an empyric promised to cure her. She remained under his cure for six months; at the end of which time, the tumor, instead of being diminished, had increased to an incredible size; the breast, measured at its base, was thirty-one inches in circumference. The lancinating pain which had for several months marked its cancerous character, tormented the patient, particularly during the night, and did not permit her to enjoy the least repose. The tumor, which occupied the whole side of the chest, consisting of many conglomerated masses, descended below the true ribs; it was irregular, rugged, and immoveable; the skin was changed in colour, and replete with varicose vessels; the patient was worn out with suffering; the catamenia were scanty and irregular.

In the first consultation, the medical attendants decided upon a palliative treatment; but in a second consultation, M. Rigal proposed to make a small incision in the centre of the breast, and to cover the wound with charpee dipped in gangrenous sanies. Between the third and fourth day after the operation, the wound inflamed, and exhaled a putrid odour; the gangrene manifested itself in the centre of the tumor, and made so rapid progress, that in eighteen days this frightful mass was entirely destroyed. On examining the separated mass, two large glands of the size of the fist were found to possess the character of true scirrhus; that is to say, a lardaceous substance, fleshy in some places; both of them contained in their centre, which was ulcerated and slightly inflamed, a yellow serum. The greater quantity of skin which had not been attacked with the gangrene adhered to the subjacent parts. A cluster of glands, resembling a bunch of grapes, supported upon a straight pedicle, alone resisted the general destruction. A ligature was tied round it, and it separated on the seventh day. The wound, dressed dry, diminished sensibly every day, and in the course of four months and a half was completely healed. This lady, treated thus in June 1791, enjoyed good health in 1810."

This separation of cancerous parts by the aid of inoculated gangrene, I consider to be a very dangerous practice. It is not only attended with all the pain of an extensive inflammation, terminating in gangrene, and of course accompanied by fever of the worst type, but it introduces a dangerous disease over which we have no controul, and which runs the risk of involving the life of the patient. We do not here merely introduce a local disease of a greater or less extent; but from the absorption of the gangrenous virus, the system becomes poisoned, and, in particular constitutions, the gangrene will know no limits, but daily increase; and from the poisoned state of the system, the vital energies are destroyed, and the patient dies of typhus fever. When an anatomist is so unfortunate as to cut his finger in dissecting a putrid body, he inoculates himself with a most noxious poison, which not only produces a gangrenous ulcer, with inflammation and swelling of the arm, but by the absorption of the virus there succeeds an alarming typhus, which has in some instances proved fatal. Besides, inoculated gangrene possesses no advantages in removing the diseased parts which the knife does not possess in a superior degree;

and this practice is not applicable to those cases where there are diseased glands in the axilla.

6th, Compression.—It has been proposed of late to destroy the diseased structure by compression, and this is attempted by means of adhesive straps, leaden plates, compresses, and bandages. The effects of compression in the destruction of tumors are very conspicuous, and this remedy has been by far too little employed in the practice of surgery. There are several diseases which are curable by compression, particularly indolent enlargements and dropsies of the joints; but with regard to tumors, compression is more suited to a tumor in an indolent than in an inflamed state; it is consequently more adapted to scirrhus, where there is no pain, than where the gland is inflamed, as in cancer. When the gland is much inflamed, pressure is quite inadmissible, as it greatly aggravates the pain, and hurries on the disease. But when there is little pain, it may be used with freedom, and is productive of manifest advantages; where there is much action, its use should always be preceded by local bloodletting by means of leeches, and repeated opiate fomentations; and until the action is subdued, no pressure should be employed. So powerful are the effects of compression, that we may obliterate the very bones; and where tumors are indolent, there is no remedy more efficacious; while, on the other hand, if there is much pain, there is no application more dangerous, as from the excitement produced by the pressure, the inflammation is hurried on to terminate in ulceration. Compression, therefore, although well adapted to scirrhus, is not fitted for cancer, whether occult or open. When we employ pressure in scirrhus of the mamma, we perceive that the surrounding cellular substance is first obliterated, leaving the tumor apparently much diminished in size, hard, and moveable; but if the compression be steadily continued, the gland itself will at last be destroyed.

In our present state of knowledge in the surgical treatment of cancer, we give the preference to the knife, when admissible, as the most expeditious, the safest, the surest, and, upon the whole, the least painful mode of procedure.

SECTION IV.

FUNGUS HEMATODES.

Fungus Hematodes has been denominated Soft cancer, in contradistinction to Hard cancer, or that succeeding scirrhus. This disease is even more certainty fatal than cancer; for if cancer is removed by operation at an early period, it frequently does not return; whereas fungus hematodes almost always returns unless we amputate the limb; the disease, therefore, when situated in the extremities, can only be cured by amputation; when situated on the trunk, it is incurable.

The early stage of fungus hematodes is characterized by a small colourless tumor, of a springy and elastic feel, unless when deep seated under the fascia, when it is firm and tense. The elastic feel is so peculiar, and so much resembles an obscure sense of fluctuation, that the practitioner has been often tempted to puncture the tumor with a lancet, thinking that it contained matter. The tumor rapidly increases in size, particularly when it receives any external injury; the disease extends by the addition of similar tumors, and thus acquires a sort of lobulated structure. When the tumor is small, the skin is of its natural colour; but as it increases in size, it assumes a reddish or copper colour in some places, and a purple or claret colour in others, with an enlargement of the veins on its surface. The tumor increases, and the skin at length becomes so distended that it inflames and ulcerates. A fungus then immediately springs forth, which knows no bounds, discharges profusely, and bleeds copiously on the slightest accident.

When the tumor is removed and the structure examined, it appears soft and pulpy, generally containing a greasy medullary looking matter, but sometimes of a greenish colour, sometimes of a dirty brown, like putrid parenchymatous viscera, such as the liver, spleen, or kidney, and sometimes of a redder colour, contained in a reticulated cellular texture, like a sponge loaded with putrid blood.

Fungus hematodes is generally attended (at least in its early stages) with little pain even on pressure; sometimes it appears spontaneously, and sometimes it can be traced to a blow. It often begins in the bones, but generally in the soft parts, and every structure of the animal body is subject to its attacks. Its progress is sometimes rapid, and sometimes slow; but when it ulcerates, its growth is particularly rapid, the fungus, although removed by ligature or torn off, being shortly reproduced.

Fungus hematodes appears at all ages, but is rather a disease of early life, and seems at first so far local that it is preceded by no constitutional indisposition. In its early stage, it frequently remains long stationary; but upon receiving a blow, it immediately increases rapidly. Like cancer, it soon involves all the neighbouring parts; the constitution becomes affected, the skin acquires a yellow hue as in jaundice, the countenance becomes sunk, the patient is attacked with hectic, accompanied by profuse perspirations; is exhausted with pain and fever, and, after much suffering, languishes in extreme debility, and expires. When any lymphatic glands, situated in the neighbourhood of the tumor, become affected, they acquire precisely the same structure as the original tumor. The fixed abdominal viscera are at the same time frequently diseased, but particularly the liver.

In several points cancer and fungus hematodes agree, while they materially differ in others. 1st, Both cancer and fungus hematodes, in whatever part of the body they are situated, although at first apparently local, soon involve the neighbouring structure, and extend to the bones, muscles, cellular substance, or whatever parts they may be in contact with. 2dly, The lymphatic glands sooner or later become affected either by continuity of surface or from absorption, and contaminate the system, rendering the removal of the original disease of no avail in effecting a cure. 3dly, When the parts ulcerate, they have no tendency to heal, they discharge a bloody sanies, and both diseases advance with a wonderful rapidity: And, lastly, when the system is once affected, if the parts are extirpated, the operation, instead of arresting the progress of the disease, accelerates the fatal event.

In the following respects, however, they differ. True cancer is clearly a disease of the decline of life; whereas, fungus hematodes belongs to early life, frequently attacking in infancy. The appearance of the morbid parts in the two diseases is very different; the structure affected is also different; cancer generally attacking a glandular structure, and fungus hematodes appearing in the brain, lungs, abdominal viscera, and all the softer textures of the body. And lastly, although cancer sometimes appears in two or three different parts of the body at one time, still the affected structure seems to be the same; whereas, fungus hematodes frequently attacks a variety of parts, and a variety of structure. Thus I have known the brain, the lungs, the liver, the kidney, and the testicle, all affected at one time in the same individual.*

TREATMENT OF FUNGUS HEMATODES.

Fungus hematodes must be accounted a fatal disease, although, when extirpation is performed at a very early period, it may sometimes prove successful. When the disease is situated on the trunk, we have no alternative but extirpation, but in every case that has fallen under my observation, it never failed to return. When situated in the eye or the testicle we also extirpate, and if the operation is performed early, we are sometimes successful. When situated in the extremities, in whatever structure it begins, we should at once have recourse to amputation, as tampering with the disease by means of pressure, or the removal of the tumor by the knife, incurs the danger of a constitutional disease, and then the amputation of the limb will not avail. In the ulcerated stage of the disease, I have prolonged life by the actual cautery daily applied, which is productive of no pain, and which not only represses the fungus, but also materially lessens the discharge.*

---

* The French surgeons have always confounded fungus hematodes with cancer, and Roux (Narrative of a Journey to London,) still asserts that the two diseases are the same; but, independently of their external features, there are several circumstances in which they widely differ, particularly in their structures, in the textures affected, and in the absence of pain in the early stage of fungus hematodes.

---

* Mr Hey of Leeds, in his Practical Observations on Surgery, has related several cases which illustrate well the nature of this disease; but a case more remarkable than any on record is the following: it is remarkable for the length of time the disease had subsisted, the number of times it had been operated on, and the size of the tumor.

John Allister, a gardner in the neighbourhood of Dunfermline, about the year 1805, when only 23 years of age, observed a small tumor of the size of a hazel-nut situated above the left haunch, moveable, elastic, and of the natural colour of the skin. In the course of three years it attained the size of a hen's egg, when he became alarmed, and as he was preparing at that time to come to Edinburgh on some other business, he meant at the same time to consult some of the faculty: however, before he could get this journey undertaken, he, one morning in coming down stairs, slipped his foot, fell backwards, and struck the tumor on the edge of a step, when it immediately inflamed, became painful, and attained the size of the two fists: He consulted a gentleman of the first practice in Dunfermline, who put a lancet into it, but it discharged a little blood only; afterwards some matter, and soon healed up: it still continued encreasing in size, and he was now advised by Dr Davidson, and some others of the medical gentlemen in Dunfermline, to repair to the Royal Infirmary of Edinburgh, and take the advice of the surgeons attending that institution. He was there told that it must be removed by an operation; he went home, and returned to the Infirmary in about six weeks, when the tumor was dissected out by Mr Newbigging on the 29th of May 1810. It was then of the size of a child's head; the wound soon healed, and he

CHAP. IV.

ULCERS.

"A Solution of continuity in any of the softer parts of the body, secreting pus, sanies, or any

---

returned home apparently well: he remained so for nine months, when it began again to grow: when it had attained the size of the two fists, he again presented himself at the Royal Infirmary, and it was cut out by Mr Russel on the 29th of October 1811, seventeen months after the first operation; it healed soon, and he returned home once more seemingly well. In nine months it began to grow again, and gradually encreased, till it attained the size of a very large mamma, or of a child's head of seven or eight years of age: on the 8th of May 1813, he came to Edinburgh; the skin was much inflamed, nearly to its basis, and eight days previous to his arrival, it burst on the top, and part of its contents, of the size of a watch, protruded, of a dark colour and a sphacelating appearance; the old cicatrix was very apparent at the upper base of the tumor.

I dissected out the tumor, and as the integuments were inflamed and diseased, no attempt was made to save them; below I cut close by the base of the tumor, and above, my incision also passed close by its base, exactly upon the cicatrix of the former operation; I dissected it out like a cancerous mamma, and where the lower part of the tumor lay above the upper part of the other vitiated matter," has been usually denominated an ulcer, and as this definition is sufficiently comprehensive and explicit, we are naturally led to

---

great glutæus muscle, there was much cellular substance, which was soft and apparently not diseased. I cut down to the upper and back part of the crista of the ilium, near the top of the sacrum, removing the sac with the tumor ; but I found that a part of the tumor passed under the latissimus dorsi, betwixt it and the longissimus dorsi ; I thrust in my finger and pulled out a portion of the size, shape, and appearance of a kidney ; I turned back the muscle, dissected out the remaining part of the sac, and not only cut down to the roots of the tumor where it was in close contact with the outer surface of the latissimus dorsi, but also cut away some of the fibres of the muscle ; I secured, by the needle, a small artery in the centre of the wound, and the patient lost about a pound of blood.

The wound was of the size of the crown of a hat, (the integuments being removed,) I dressed it with lint, passed one or two adhesive straps across to keep up a degree of compression, laid on a compress, and bound all up with a roller.

When the diseased mass was examined after extirpation, it was found to consist of various tumors contained in distinct sacs, some of a grey colour, and nearly of the consistence of the kidney, and others of a reddish colour, apparently composed of coagulated blood, although firmer in consistence, and variegated or streaked with greyish lines. An attempt was made to preserve it in spirits, but it gradually dissolved.

The wound healed so fast, that in three weeks after the operation, it was reduced to the size of a five-shillings piece ; in a month more it was completely cicatrized, the disease seemed eradicated, he enjoyed good health, and resumed his work, but he did not remain long well. In seven months after, in the beginning of 1814, this tumor again shewed a disposition to grow.

adopt it. When we come to treat of the different species of ulcers, we shall point out the characters by which they specifically differ from each other,

---

It began anteriorly to the old scar extending towards the abdomen, it encreased more rapidly than at any former period, having in two months attained nearly the same size as when last extirpated. He came to Edinburgh in May, when the tumor was as large as the head of a child of eight years, it had a springy and elastic feel; the integuments in some places were of a dark red, in others of their natural colour, with enlarged veins on its surface, but the skin was not ulcerated. It was now extirpated by Mr John Bell; a great part of the integuments was removed, the wound healed kindly. When it was reduced to the size of a crown-piece, it was judged advisable to keep it open as an issue. He returned home, the issue continued to discharge freely, and his health kept good till March 1815, when the tumor began a fifth time to grow, commencing a little below the issue, and spreading upwards to the false ribs.

On the 12th of December 1815, he came to Edinburgh.—The tumor then extended in a flattened form from the posterior part of the spine of the ilium upwards over the false ribs, spreading round over the abdomen; from the ulcerated surface, the seat of the issue, a large fungus had sprung, resembling a sun-flower. No operation at this time was performed. He was desired to keep cloths wet with a decoction of oak-bark and alum constantly applied to the surface, and to return home.

He came again to Edinburgh on the 13th of June 1816 with the tumor, and more especially the fungous part greatly enlarged, and his health was considerably impaired by the continued discharge and frequent bleedings from its surface; the surrounding skin was inflamed and painful from the excoriation with the method of cure best adapted to each, while we still keep in view that there are several circumstances which relate to ulceration in ge-

---

produced by the matter; the fungus resembled in size and shape a large cauliflower, with a pedicle two inches in diameter; it had a variegated appearance, the base of the colours being a greenish-yellow. His constitution was now manifestly affected; he had a sunk and yellow countenance, was much emaciated, his appetite greatly impaired; the discharge from the fungus profuse, fœtid, and thin; his pulse about 150, and he was much distressed with nocturnal perspirations.

To obviate the debilitating effects of so profuse a discharge from so large a surface, and to lessen the general irritation, I determined upon removing the fungus; but being apprehensive of hemorrhage if I employed the knife, I had recourse to a ligature, more especially as the pedicle did not exceed six or seven inches in circumference. Every time the ligature was tightened, which was done daily, it produced considerable pain, but the discharge gradually decreased. In eight days, the fungus was so nearly separated as to be easily turned or twisted in every direction. I cut the pedicle across close to the ligature; I then removed the ligature, and the surface only oozed out blood. A pledgit of linen and a roller were applied, and three hours after the patient walked about relieved from an incumbrance which he had borne for some months with great uneasiness.

As soon as the fungus was removed, he returned to Dunfermline, and in a great measure recovered his health; the nocturnal perspirations ceased, his pulse fell nearly to its natural standard, his appetite improved, and he acquired additional strength. He continued tolerably well the remaining part of 1816 and the early part of 1817, although the tumor during that time increased much in size. By the beginning of neral, and which are applicable to every variety of the disease.

Ulcers assume a different appearance, and are

June, it had acquired a very large size, and shot forth several fungi, from which so great a discharge took place as again to impair his health, and oblige him gradually to relinquish every kind of work.

He again presented himself at Edinburgh on the 9th of September, when the disease was in the following condition.—The tumor was lobulated, consisting of three divisions; the largest of the size of a quartern loaf, the second like the head of a full-grown fœtus, and the third much smaller, measuring, in all, three feet at the base. From the surface of these tumors, there sprung three fungi. To the side of the larger tumor, there was attached a fungus as large as a full-sized cauliflower; upon the surface of the one next in size the fungus was as large as the fist; and on the third the size of a small apple.

The discharge from these ulcerated surfaces was so profuse, as materially to affect his health. I applied to the fungi the actual cautery, and which, as it produced no pain, I recommended to be continued, to repress their growth, and lessen the discharge. He returned home, and, on the 25th of January 1818, I received a letter from Dr Stenhouse, in Dunfermline, under whose care he was, stating, that he had died a few days before, quite exhausted by the long-continued discharge from the fungus. Dr Stenhouse, in his letter, observes, that " the skin had given way all over the tumor, so that the quantity of matter discharged was lately very much increased, notwithstanding the regular daily application of several red-hot irons. The actual cautery gave him no pain, and had certainly great effect in repressing the growth of the fungus. I even think that the tumor at length was somewhat diminished;

more or less difficult to cure according to the time of life at which they occur, according to the seat of the disease, the habit of body, and the structure affected. Thus ulcers are more easily healed in early life than in old age; because in the former case the actions of the system are more perfect. When seated on the trunk or upper parts of the body, they are more easily cured than in the lower extremities; because in the latter, the vital powers are more languid. In temperate habits, more easily than in drunkards, because in the former all the functions are performed with more vigour and regularity. And in skin, cellular substance, and muscle more readily than in bone,

---

large pieces fell off frequently in a putrid state, and as if they had been contained in cysts."

"I had an opportunity of ascertaining the extent of the disease after death. I found the tumor passing upwards under the ribs, with only a thin partition between it and the liver, which it had pushed forwards. By a slight operation of the fingers, the whole tumor fell out, leaving a bag, which seemed to be composed of the peritoneum. Excepting a few small hard tubercles, about the size of barley-corns, in its left lobe; the liver and all the other viscera were perfectly sound."

This man lived about thirteen years from the commencement of the tumor, and seven years eight months from the time it was first operated on; and, notwithstanding the absence of visceral disease, and the length of time it subsisted, its structure and external marks, together with its invincible obstinacy, declared it to be true Fungus Hematodes.

cartilage, ligament, or fascia; because the former parts are more vascular, and thus capable of shooting out granulations more readily than less vascular parts.

It must be remembered, that the discharge from all ulcers is merely a secretion entirely modified by the nature of the ulcer, and that the matter discharged did not originally exist in the blood. Thus a healthy ulcerated surface will produce pure pus; an irritable ulcer a thin ichor; a callous ulcer a gleety discharge; a herpetic ulcer a corrosive virus; and an ulcerated surface, in a constitution infected with a morbid poison, will secrete that specific poison which propagates the disease. That the matter discharged from ulcers was not a secretion modified by inflammation, structure, and habit, but that it originally existed in the blood, rendering it dangerous to attempt their cure, was not only the prevailing doctrine of the ancients, but of some of the moderns; a doctrine which formed a part of the humoral pathology, but which has been gradually exploded, as we have acquired more correct notions of the animal economy.

Modern writers, both French and English, have adopted very different arrangements in the classification of ulcers. Many of these are arbitrary, and embrace no practical facts. The division into Local and Constitutional, (followed by Mr Benj. Bell), seems to be the most eligible, as being the most natural, the best adapted to practice, and the one generally adopted; yet it must be received with some qualifications: it ought to be remembered, that no ulcer can be accounted strictly local, the constitution must always have a manifest influence over the sore, or rather the face of the sore will assume a different aspect, according to the state of the constitution. An attack of dysentery or diarrhœa, the accession of a febrile paroxysm, or even a fit of drunkenness, will, in a few hours, by inducing local as well as general debility, change a healthy granulating ulcer, secreting thick pus, into a pale flabby sore, discharging a thin ichor; in local ulcers therefore, while we employ local remedies, we must still direct our attention to the general health, to support the vital powers and regulate the actions of the system.

LOCAL ULCERS.

As local ulcers, I should enumerate seven species.

1. The Simple Healthy Ulcer.
2. The Irritable Ulcer.
4. The Indolent or Callous Ulcer.
4. The Fungous Ulcer.
5. The Carious Ulcer.
6. The Herpetic Ulcer, or Noli me Tangere.
7. The Cancerous Ulcer.

CONSTITUTIONAL ULCERS.

As constitutional ulcers, I should enumerate four species, viz.

1. The Scrophulous Ulcer.
2. The Scorbutic Ulcer.
3. The Venereal Ulcer.
4. The Mercurial Ulcer.

This arrangement of ULCERS approaches nearer to Mr Bell's, than to any other, while it differs from his in some little particulars. He reckons eight species of local ulcers, or one more than I have here enumerated; this additional species is the sinuous or fistulous ulcer. But that is merely a variety of the callous or indolent ulcer, being a callous or indolent tube, while the other varieties consist of callous or indolent open surfaces, and although there may be some little difference in the treatment, still they become alike difficult of cure, chiefly from their indolent surface, or from want of action. I therefore conceive, that both these ulcers (the sinuous and the callous or indolent,) may be with great propriety treated of under one species.

Under constitutional ulcers, Mr Bell arranges three species, the venereal, the scorbutic, and scrophulous; to this I have added a fourth species, the mercurial ulcer, which is distinguished by an irritable character, arising from the long continued and imprudent use of mercury.

All these ulcers which we have enumerated, both local and constitutional, possess distinct characters by which they may be discriminated, and each requires a different method of treatment; before we attempt the cure of any ulcer, it is therefore manifest, that it must be of the first importance to ascertain the species to which it belongs; this materially influences our conduct, and renders our practice at once rational and simple, as we possess distinct rules for the management of each.

Before a sore can form healthy granulations, there must exist a certain degree of action; when there is little or no action, as in the indolent ulcer, no granulations are formed; when the action is too violent, as in the irritable ulcer, the granulations are destroyed as soon as formed; when the action is languid, the granulations are white, large, soft, and spongy; and when the action is just in a proper degree, the granulations are small, firm, and red, as in the simple healthy ulcer: the great art therefore in the cure of all ulcers, is to keep up such a degree of action, as is sufficient for the formation of healthy granulations,—to moderate this action when too violent, and to increase it when too languid.

SECTION I.

LOCAL ULCERS.

In this class of ulcers, we chiefly, though not exclusively, employ a local treatment. We occasionally have recourse to constitutional remedies, to assist in changing the mode of action in the sore, but still the local treatment forms the most essential part of our practice.

1st, SIMPLE HEALTHY ULCER.

The Simple Healthy ulcer is characterized by granulations, small, numerous, distinct, firm, and of a florid red; as soon as these granulations reach the level of the sound skin, a thin cuticle begins to be formed, generally at the edge, but sometimes in the middle, and sometimes in distinct specks or points over the whole surface of the sore, and the discharge or secretion is a pure thick pus, not profuse, but in moderate quantity.

The simple ulcer occurs in healthy structure, and is more distinctly marked in youth and in manhood than in old age. It may be defined a healthy action of the system to repair lost parts, and is a regular uninterrupted process from the commencement of the ulceration till cicatrization takes place.

The simple healthy ulcer is well illustrated by an abraded surface in a sound constitution, it is generally produced by burns, abscesses, or wounds, especially where there has been a loss of substance; in fact it is the process employed by nature to repair lost parts, and is what is called, in technical language, the healing of sores by the second intention in a healthy system. This healing process is compleated more or less rapidly, according to the size of the breach to be repaired, the period of life, the site of the disease, and the vigour of the constitution.

TREATMENT OF THE SIMPLE HEALTHY ULCER.

As the action in the simple ulcer is just sufficient to form healthy granulations, and as cicatrization naturally follows as soon as the granulations gain the level of the sound skin, it is manifest that nothing is required for the cure of this species of ulcer, but the most simple dressings; whatever increases or diminishes the action, is alike inimical to the healing of the sore; thus, a tight roller or the adhesive strap, by encreasing the action or exciting inflammation, would convert a simple into an irritable ulcer, or the continued use of warm emollient poultices, would lessen or even destroy the action, render the gra nulations large, pale, and flabby, change the discharge from good pus to a thin gleet, and make it assume the form of the indolent ulcer; this remark I am induced to make, from observing that a late writer on inflammation indiscriminately recommends three different applications, under which we are told this ulcer in general heals very readily. These are the common emollient or suppurating poultice, dry charpie, and adhesive straps, applications which are evidently suited to three distinct species of ulcers: namely, the warm emollient poultice for the irritable ulcer, the dry charpie for the simple ulcer, and the adhesive strap for the indolent ulcer. I formerly remarked, that the great art in the cure of all ulcers, was to keep up such a degree of action as was sufficient for the formation of healthy granulations, to moderate this action when too violent, and to increase it when too languid. If we therefore apply stimulating or irritating applications to a simple ulcer, we shall immediately convert it into one of the irritable kind; or, if we apply simple dressings to an indolent ulcer, it will never increase the action, and the sore will never heal; the indiscriminate application of the emollient poultice, dry charpie, and the adhesive strap to the simple ulcer, or indeed to any ulcer, must not only lead to an empirical and irrational, but to an unsuccessful practice.

The treatment of ulcers is founded on rational principles; we have only to increase or diminish the action, as it rises above or falls below the healthy standard, or to destroy any morbid poison existing in the system, as the syphilitic virus. Our object therefore is, first, to ascertain the class to which the ulcer belongs, and which determines its name; and, secondly, to employ the mode of treatment best adapted to that particular species.

As there exists a due degree of action in the simple ulcer, nothing must be done either to increase or to diminish that action. Simple dressings only are required; and of these the best is dry lint in the middle, with slips of cerate round the edges of the sore. The dry lint absorbs the pus, and excludes the air from the sore, while the slips of cerate separate easily from the edges, and are not apt to tear off the newly-formed cuticle. Ointments, and greasy applications in general, agree ill with ulcers, and are particularly ill suited to the simple ulcer.—They are apt to become rancid, and then uniformly irritate and inflame. Over the dry lint, a small compress and roller may be applied; but this should be done so as to make a very slight degree of pressure. If the pressure be too violent, the sore immediately loses its healthy appearance, and assumes the irritable form. Indeed the roller is not adapted to the simple ulcer. When the granulations reach the level of the sound skin, the ulcer then in general begins to cicatrize; if not, the surface of the sore may be dusted with some simple dry powder, as tutty, lapis calaminaris, or ceruss; or if there appears to be a defect of action, it may, at each dressing, be washed with a weak solution of the cuprum vitriolatum, while we at the same time support the healthy actions of the system by free air and a generous diet. If the ulcer be situated on the leg or foot, it will heal much more readily, by avoiding walking, and placing the limb horizontally on a level with the body.

2d,—IRRITABLE ULCER.

The Irritable Ulcer is the same which Mr Benj. Bell calls the simple vitiated ulcer, or that species which Sir E. Home denominates "Ulcer in parts, whose actions are too violent to form healthy granulations," whether this arises from the state of the parts, or of the constitution.

This ulcer is characterised by the following marks: The surface of the sore is sometimes whitish or ash-coloured, but more frequently of a brownish or dark-red colour. There are no distinct granulations, and the whole surface is either smooth or flattened or disfigured by irregular hollows, as if the acrimony of the discharge had destroyed the newly-formed parts; the edge of the ulcer is irregular, as if excoriated; there is a degree of inflammation more or less apparent surrounding it; considerable pain, particularly when touched, and the secretion is thin, of a reddish and sometimes greenish colour, and frequently so acrid as to excoriate the neighbouring parts.

The irritable ulcer is produced by the application of irritating substances, adhesive straps or tight bandages to the simple ulcer, or is the effect of a high irritability of habit, impressing this peculiar character on sores originating from bruises, wounds, and other injuries. The irritable ulcer is particularly apt to occur in these habits after the ulceration of mucous membranes, as in the inside of the nose, within the mouth and lips, upon the glans penis, in the urethra, and on the labia and nymphæ; but when it appears on the extremities, it most frequently presents itself on the shin or outer ankle, and is the most troublesome ulcer that we meet with, and the most difficult to manage, frequently requiring a variety of treatment.

TREATMENT OF THE IRRITABLE ULCER.

The great object in the treatment of this ulcer, is to lessen the irritability, or diminish the excessive action: and to effect this, the modes of procedure to which we generally have recourse, are three, namely, cold anodyne lotions, warm emollient applications, and caustics. Each of these have their partizans; they all have effected a cure, and we find, that sometimes the cold and sometimes the warm applications succeed best; but as far as my experience goes, it appears to me that the preferable mode of treatment is in general the warm. If the ulcer be small, and the irritability not great, we may try the cold in the form of pure water, salt and water, solutions of lead, or solutions of opium. A piece of linen should be kept constantly wet with one or other of these, and applied to the ulcer, or we may apply the cold Goulard poultice; but when the ulcer is large, the irritability great, and the pain very distressing, I should prefer the warm, because the effects of the cold are more evanescent; they soon become heated, and are not so much under the controul of the surgeon as the warm; besides, the warm not only as readily, if not more effectually, allay the pain, but they promote the formation of granulations, a point of essential importance. The warm applications may consist of fomentations, composed of a solution of opium, of the decoctions of chamomile flowers and poppy-heads, of hemlock-leaves, of digitalis or henbane-leaves, and warm emollient poultices. The sore should be carefully fomented three times a-day, in the morning, at mid-day, and at bed-time, for half an hour at least each time, and covered immediately with a large warm emollient poultice, composed of bread and milk, or of oatmeal and linseed meal, softened with oil, lard, or fresh butter. These poultices should be applied not only after each fomentation, but renewed every three hours, as it is only by their heat that they prove beneficial. When the irritability lessens, and the ulcer begins to granulate, a piece of dry lint should be interposed betwixt it and the poultice. All pressure should be avoided, as increasing the irritability; we therefore use no compresses or rollers, but wrap a handkerchief loosely round the limb. When once the sore has been converted into the simple ulcer, we use the simple dressings, occasionally recurring to the fomentations and the warm poultices to soothe or allay the over-action. The poultices should not be too long continued, but left off if the granulations seem disposed to become loose and large, as by persevering too long in their use we are in danger of destroying the action, and inducing an ulcer of a different character equally difficult to heal.

Caustics destroy the irritability of sores, and the irritable ulcer may be managed by touching it occasionally with solid caustic, or pencilling its surface with a strong solution of the argentum nitratum or the muriate of mercury, using at the same time the warm emollient poultice; but it appears to me that the caustics are chiefly adapted to the irritable ulcers of mucous membranes, and the warm fomentations and poultices to those of the extremities. When the local symptoms of irritability appear to arise from constitutional causes, as a fullness of habit or quickness of pulse, we must have recourse to general blood-letting, purging, and low diet, avoiding every source of irritation.

3d,—INDOLENT OR CALLOUS ULCER.

After an ulcer has been of long standing, especially in the decline of life, in intemperate habits, in warm climates, or wherever the constitution is exhausted, it becomes stationary, and shews no disposition to heal; the edges become thick, smooth, and callous; no distinct granulations are formed, but the surface of the sore appears smooth and glistening; and, from its high and prominent edges, this ulcer is in general very deep; the discharge is thin, profuse, and viscid or glutinous, generally adhering so tenaciously to the surface of the sore, that it is wiped off with difficulty; but sometimes there is no discharge, and the face of the ulcer is then of a dark-grey or brownish colour, and perfectly dry. Sometimes the ulcer heals in one place, and spreads in another; or it regularly diminishes in size for a time, and then becomes stationary; and sometimes it begins to spread, and suddenly regains its former size. This seems to be attributable to the chronic inflammation with which this ulcer is frequently accompanied. The limb is often considerably enlarged, of a dark red or purple colour, especially round the ulcer; it feels hard like a board; and the edges of the sore are not only prominent, but often separated to some extent from the subjacent parts.

This is the ulcer which is so troublesome among soldiers and seamen, which so frequently occurs in the lower ranks of life, which is so difficult to cure, and which has chiefly occupied the attention of practitioners. It is the character which ulcers of the legs assume after they have been of long standing. They are then generally accompanied by a dilated or varicose state of the superficial veins, a circumstance very unfavourable to the healing of the sore.

TREATMENT OF THE INDOLENT OR CALLOUS ULCER.

THE older surgeons in the treatment of this ulcer, direct the callous edges to be excised with the scalpel, or destroyed by caustic; warm emollient poultices to be applied to the sore, and for varicose veins, the laced stocking or the roller. This treatment is also recommended by Mr Benj. Bell, and generally adopted in hospital practice, but, as far as I have observed, with very little success. The ulcer is not prevented from healing merely by its callous edges, but from the general want of action. Whatever effect the poultice may have, must arise from its heat, and, to be productive of the least benefit, that heat must be kept up by a renewal of the poultice every second or third hour; whereas, from the manner in which the poultice is commonly applied, namely, once in the morning and once at bedtime, instead of proving salutary it must have a contrary effect, and rather prevent the healing of the ulcer.

From the manner in which fomentations and poultices are in general applied to ulcers, they can be productive of very little service. Sir E. Home* says; " The fomentations are commonly applied by means of flannels, for about ten minutes or a quarter of an hour, each time the poultice is changed, which is generally twice in the twenty-four hours" : whereas, whenever it is found necessary to use fomentations and poultices, instead of ten minutes or a quarter of an hour, twice a-day, and a poultice twice in the twenty-four hours, the fomentation should be used four times in the twenty-four hours, half an hour each time at least, and the poultice should be renewed every three hours; as it is only by the excitement arising from the increased and continued heat that fomentations and poultices prove useful.

As the great art in the treatment of ulcers consists in moderating the action when too violent,

---

[*] *See* Home *on Ulcers;* p. 200.

and in exciting it when too languid, and as there is evidently a defect of action in the indolent or callous ulcer, it is manifest that our chief efforts should be directed to increase the action, and to rouse the powers of the system, and this should be effected both by local and constitutional means. The means which surgeons have had recourse to in the treatment of this species of ulcer, have all operated by stimulating and encreasing the action of the part, such as warm fomentations, warm poultices, solutions of caustic, the tincture of myrrh, lemon juice, ardent spirits, the gastric juice of ruminating animals, the red oxide of mercury, whether by itself or combined with resinous ointment, the ointment of nitrated mercury, hot dressings, such as warm turpentines and resins, the adhesive strap, compress, and tight roller. Each of these has no doubt occasionally effected a cure, but one great objection to all stimulating applications is, that they soon lose their effect, the ulcer in a short time becomes accustomed to the stimulus, remains stationary, and unless the stimulus be from time to time increased, we arrive at a point when we can make no farther progress in the cure. This is not the case, however, with the adhesive strap and roller; the strap excites an irritation which it perpetually keeps up, and the callous ulcer is the only species of ulcer where the use of it is admissible; the roller is particularly useful where there are varicose or dilated veins, as it supports the veinous circulation.

The adhesive strap and roller are undoubtedly the preferable local applications in the treatment of the indolent or callous ulcer, but conjoined with the local treatment, we should also call in the aid of constitutional remedies. In the treatment of this species of ulcer, writers have almost exclusively recommended local applications; but we shall find that whatever encreases the general circulation, and rouses the actions of the system, has a marked effect in curing this ulcer. Whenever writers have prescribed internal or constitutional remedies, they have consisted in a generous diet, bark and wine; but these are comparatively of little value when placed in the scale with capsicum, cayenne, and the other species of peppers, cantharides and mercury. Mercury is especially valuable: it is a great mistake to imagine that this medicine is useful only in venereal sores. Mercury is a most powerful stimulus, raising the pulse from its healthy standard, to 140 or 150 beats in a minute, and under its operation indolent or callous sores heal rapidly.

In the treatment of the indolent or callous ulcer, we have said that the older surgeons had recourse to the scalpel or to caustics, to destroy the indurated edges, to warm emolient poultices, to resinous ointment combined with the red oxide of mercury, and to the laced stocking. Mr Benj. Bell adopts nearly the same practice; Underwood recommends the ungt. resinosum with the red oxide of mercury, and a tight roller, which was the practice generally followed by surgeons twenty or thirty years ago. Mr Baynton of Bristol recommends the adhesive strap, which is now the most general and most successful practice. Sir E. Home recommends a variety of practice, but seems chiefly to trust to caustic solutions, to the nitrous acid diluted in the proportion of a scruple to eight ounces of water, to the ointment of nitrated mercury, but most especially to the adhesive strap. The army and navy surgeons employ lemon juice, ardent spirits, caustic solutions, the gastric juice of ruminating animals, the tincture of myrrh, the red oxide of mercury, resinous ointment, combined with the red oxide of mercury, warm emollient poultices, the adhesive strap, and bandages.

In the management of this ulcer I trust entirely to the adhesive strap, compress, and tight roller, as local applications; and never employ fomentations or poultices, except when there is much irritation or inflammation surrounding the ulcer, or when the limb feels hot and hard, which is no doubt frequently the case after much walking or other exercise. When a patient presents himself with an ulcer, in this condition, fomentations and poultices are the best applications preparatory to the use of the strap and roller; along with the local applications I always have recourse to constitutional or internal remedies, as the capsicum cayenne, and other peppers, but especially to cantharides and mercury; these have a wonderful effect in rousing the powers of the system, and encreasing the action in the part.

When the patient has been exposed to much fatigue, and the limb is inflamed, hard, and painful, it should be fomented three times a day, half an hour each time, with warm flannels steeped in a decoction of poppy heads, and chamomile flowers, with the addition of a little opium; after each fomentation a large emollient poultice should be applied to the ulcer, as hot as the patient can bear it. After the fomentation and poultice have been continued for two or three days, all irritation is generally removed, when they should be discontinued, and the adhesive strap, compress, and roller used in their stead.

The limb should first be shaved, otherwise the hairs, by sticking to the plaster, produce great irritation; the plaster spread upon linen, is now to be cut into strips of such a length as to encircle only two-thirds of the limb, for if they include the whole circumference, they act as tight ligatures, obstruct the veinous circulation, and produce swelling in its lower part; each of the strips must now be applied in succession, first by fixing it on one side, and then pulling it with some degree of firmness directly across the ulcer in immediate contact with it, without the interposition of lint or any other dressing, for if any thing be interposed betwixt the ulcer and the plaster, it has not the same salutary effect which it would otherwise have. This proves that the adhesive strap does not act solely by affording a support to the parts, by compression, or by approximating the edges of the ulcer, but chiefly by producing irritation and encreasing the action. If there is much discharge, a small slip should be cut out of that portion of the plaster which covers the ulcer to allow this discharge to escape. Wiseman was in the habit of using the adhesive plaster to this species of ulcer, but he seems always to have applied it over the dressings, in consequence of which, it could act only upon the same principle as the roller or laced stocking, by affording mechanical support.

This is the only species of ulcer in which the adhesive strap is admissible, and in the treatment of no other should it ever be used. It is undoubtedly the greatest modern improvement in the treatment of old ulcers, and one for which we are particularly indebted to Mr Baynton of Bristol. Immediately above the adhesive straps we place a small compress, and then apply a roller; the roller should be either of cotton or flannel, or, what is preferable, of thin serge. The navy surgeon will find old ensigns, and other flags used on board of ship (called Buntin,) admirably adapted for this purpose; it is so thin as not to overheat the limb, and it possesses such a degree of elasticity as to yield to any swelling. The roller should be so applied as to embrace the whole limb; when the ulcer is situated in the leg, we begin by applying it at the ancle, carry it across the fore part of the foot down to the toes, and then, by circular turns of a moderate degree of tightness, bring it up the whole leg, ending above the knee and encreasing the pressure as we pass over the ulcer. When the ulcer is of great extent, and the circumstances of the patient will allow it, we should also enjoin the horizontal or recumbent posture of the limb, which contributes greatly to the cure, and which is more particularly requisite where there are dilated veins.

The views of practitioners in the treatment of the indolent or callous ulcer, as I have already observed, have been chiefly directed to local applications; but we shall find our practice much more successful if we combine with these such constitutional or internal remedies as will raise a febrile action in the system. Of these constitutional remedies, the most potent I consider to be the various species of peppers, cantharides, and mercury. If the ulcer be of small extent, and not of long standing, we may recommend a small quantity of West India pickles, which contain the various species of capsicum, as the coral pepper, the cockspur pepper, the bird pepper, &c., to be swallowed three or four times a-day; the food to be well seasoned with Cayenne pepper, and a wine-glassful of pepper punch to be drank occasionally, or one drachm of the tincture of pepper in a wine-glassful of cold water three or four times a-day, made in the proportion of half an ounce of pepper to a pound of alkohol. If the ulcer has been of long standing, is of great extent, and seems to possess little action, it will be better to try the cantharides, beginning with twelve or fifteen drops of the tincture three times a-day, in a little cold water, and gradually increasing the dose till we find that it has considerably quickened the pulse, increased the flow of urine, with a degree of stranguary, and excited great irritation in the ulcer. If the ulcer has continued for years, and has a decidedly bad aspect, it will be better to begin at once with the mercury, and it may be used either in the form of unction or of pill. Our great object is to increase the vascular action; and as soon as we observe the pulse begin to rise, the sore begins to granulate, the discharge to become thicker, the edges of the ulcer to soften, and the whole to assume a healthy florid appearance.

Although we prescribe these rules for the treatment of the Indolent or Callous Ulcer, we must recollect that it is frequently incurable from the length of time it has existed, acting as a habitual issue, from the total want of action in the part in consequence of being situated far from the heart, from the constitution being ruined by intemperance, by a warm climate, and by other causes; from old age, from visceral obstructions, which greatly affect the circulation in the lower extremities, and from a variety of less apparent causes.

The Fistulous or Sinuous Ulcer, which is treated of as a distinct species by Mr Bell, is only a variety of the Indolent or Callous Ulcer. It is merely an indurated or callous tube, and is prevented from healing by want of action; therefore, whatever excites inflammation or increases the action will cure the fistula, such as stimulant injections, passing a seton through the tube, or laying it open from the bottom by incision. Mr Bell prefers the seton; but wherever it is admissible, laying it open by incision is the general and preferable practice, when it heals partly by exposure to the air, but chiefly by the inflammation excited in consequence of the incision and the manner of dressing.

Where both the seton and knife are inadmissible, the callous tube may be readily cured by dilating with sponge tent; a small piece of sponge tent of a conical form, and of such a length as will reach the bottom of the sinus should be introduced, and daily increased in thickness so as to dilate it: while we increase the thickness of the tent, we at the same time shorten it, which permits granulations to spring up from the bottom. In proportion as the sinus is dilated, it becomes shorter and at last assumes somewhat the form of an open ulcer, when by exposure to the air with the aid of stimulating dressings, and the constitutional remedies already recommended, it in general soon heals. In this way I have cured sinuous ulcers situated in the perinæum, and in the vicinity of the rectum, where I durst not employ the knife.

In the management of the Indolent or Callous Ulcer, we have recommended constitutional as much as local treatment; and although we divide ulcers into local and constitutional, still we must remember that no ulcer can be considered as strictly local, but that the state of the system must regulate the aspect of the sore; and we shall find that our practice will be more or less successful, not only in the treatment of ulcers, but in a variety of surgical diseases, in proportion as we direct our attention to the state and operations of the general system. *

---

* In the treatment of the callous ulcer, the French surgeons trust almost entirely to emollient poultices. They first cover the ulcer with a layer of soft lint, and over that apply a warm emollient poultice, so large as to cover the neighbouring parts to a considerable extent. They change the dressing once a-day; but if the weather is hot, the ulcer large, and the discharge very profuse, the dressing is renewed twice in the twenty-four hours. They do not lay aside the poultice as soon as the ulcer begins to look healthy, but continue its use for some time longer, interposing betwixt it and the sore a thicker layer of lint. When the ulcer looks quite healthy, and continues granulating, they lay aside the poultice, use dry lint only, and repress luxuriant granulations by means of the nitrate of silver.

They conjoin with this local treatment a temperate regimen and gentle tonics; they confine the patient to bed during the

4th,—FUNGOUS ULCER.

In the simple healthy ulcer, it sometimes happens, that when the granulations have risen to the level of the adjacent skin, instead of shewing a disposition to cicatrize by a thin pellicle forming round the edges of the ulcer, or appearing on its surface, they continue to sprout, and rise above the level; no pellicle is formed, but the granulations become large, loose, and of a rounded form, and they are of a pale colour, or semitransparent like the softer species of nasal polypi. This luxuriant growth and weak texture of the granulations constitute what writers have called the Fungous Ulcer.

The fungous ulcer is in general connected with the simple healthy ulcer, and the description which I have now given applies to its most sim-

---

whole of the cure, not permitting him to walk about till the sore is entirely healed. They consider an ulcer of the leg as purely local, and this is the treatment they pursue whether inflammation in the surrounding parts be present or not.

Some French surgeons, in the treatment of old ulcers of the leg, have of late used the adhesive strap, but the practice is by no means general; and from Roux's observations on this subject, it would appear that he has no idea that the strap acts by exciting irritation, and increasing the action; but that it cures partly by compression, partly by approximating the edges ple form. Fungous ulcer is, then, nothing but a healthy ulcer with luxuriant and loose granulations; a similar state of action is also frequently present in the irritable and carious ulcers. When the granulations become luxuriant in the irritable ulcer, they partake of the true character of that ulcer; after they have risen to a certain level, they become so irritable and weak that they are not able to maintain themselves, but give way and are absorbed, and the ulcer is reduced to its former level.

This species of ulcer occurs most frequently in weak constitutions; hence the too long continued use of poultices or fomentations, or whatever induces local debility, has a manifest tendency to produce it, and we observe that ulcers assume the fungous appearance in proportion as their situation is more or less distant from the heart.

The ulcers which most frequently generate fungi, are the simple healthy, the irritable, the

---

of the sore, and partly by the materials of which the plaster is made, contributing by its "resolutive action" to the dissipation of the hard and callous state of the edges of the ulcer.

The treatment of the callous ulcer by the adhesive strap, adopted by the English surgeons, is decidedly preferable to the treatment by poultices followed by the French, for two very obvious reasons; first, It does not confine the patient; and, secondly, The cure is accomplished in less than one-third of the time.

carious, the cancerous, and the scrophulous ulcers; but it is chiefly in the simple ulcer that they appear, and they are in fact nothing else than luxuriant granulations, which, in proportion as they become luxuriant, become weak, and have no disposition to cicatrize. This is the usual acceptation of the term Fungous Ulcer, and it may appear in any part of the body, but it is most commonly situated on the lower extremity, being far distant from the heart. There are two other species of fungus which we frequently meet with, one of the testicle, and the other arising from the ulceration of soft cancer, or what is called Fungus Hematodes. The fungus of the testicle appears in consequence of inflammation and suppuration; and as soon as the abscess bursts, there springs out an excrescence of the appearance of cauliflower, firmly attached by a broad base to the body of the testicle. This, however, is not a malignant disease as its appearance would indicate, but is easily cured by escharotics and pressure, while the fungus hematodes in its ulcerated state is incurable; for whether removed by the knife or by escharotics, it is in a short time reproduced.

TREATMENT OF THE FUNGOUS ULCER.

I HAVE many proofs that the fungus hematodes, in its ulcerated state, although destroyed by escharotics or removed by the knife, is shortly reproduced, but the fungous ulcer under consideration is of a more simple form, and is to be treated by escharotics and pressure. In the simple healthy ulcer, when the granulations have risen to the level of the sound skin, if there appears no disposition to cicatrization, we should immediately have recourse to gentle stimulants and pressure, because in proportion as the granulations are allowed to rise, they become loose and weak, and have no disposition to heal but form the true fungous ulcer. In this state of things, the best application is a bit of lint dipped in a weak solution of the sulphate of copper, or the sore may be occasionally washed with a strong solution of alum, or a strong decoction of oak-bark; a piece of dry lint is then to be applied with a compress placed above it, and a roller over the whole applied with some degree of tightness. The astringent solutions or decoction strengthen the granulations, and dispose to cicatrization, while the compress and roller not only restrain their growth, but, by supporting the parts, give additional strength.

These are the best means to prevent the fungous ulcer; but if this ulcer should be formed before the surgeon is called, the fungus must be removed by excision, or destroyed by caustic. Excision was generally employed by the older surgeons, but escharotics are preferable, being neither so formidable nor so painful, and in using them we are not troubled with hemorrhage. The escharotics commonly employed are caustic potash, the nitrate of silver, the corrosive muriate of mercury, and the sulphate of copper, either in substance or in solution. One of the best applications is the nitrate of silver; it acts quickly, and produces less pain than the feebler escharotics. The surface of the ulcer may be touched with it occasionally, or it may be pencilled with a strong solution every second day, till the fungus or luxuriant granulations are destroyed; a bit of dry lint is then to be applied with the compress and roller. When the fungus has been destroyed, and the granulations reduced to a level with the sound skin, we must have recourse to the stimulant or astringent solutions or decoction, and the compress and roller, which are admirable applications in the treatment of the fungous ulcer, as the parts are weak and require support. Under this treatment, we shall most commonly find this ulcer heal; but if it appears to be connected with a debilitated state of the general system, along with the local we should combine a constitutional treatment, such as bark and wine, a nourishing diet, the preparations of iron, and cold bathing.

5th,—CARIOUS ULCER.

Carious Ulcer is nothing but an ulcer including caries of a bone, and this caries is precisely the same as ulceration of the soft parts; therefore carious ulcer is only the ulceration of these parts extending to the bone. The inflammation and ulceration extend first to the periosteum, the acrid matter corrodes this membrane, the bone deprived of it dies, and this ulcer is formed. Caries is only an adventitious circumstance, and in combination with this circumstance the ulcer may be simple, irritable, or indolent. It is precisely like a varicose ulcer; it ought not to constitute a species but only a variety; but as it possesses a particular character, we assign it a place among the local ulcers, and we shall give a short account of its peculiar character and method of treatment, reserving caries or ulceration of the bones till we come to treat of the diseases of that structure.

In this ulcer the granulations are luxuriant, large, and loose, and in general so soft that the probe can be easily pushed through them to the bone. They are of a greyish or dark-brown colour, and have a glazed appearance; they are of a rounded form, and sometimes clustered together like the berries of the honeysuckle. The discharge is thin and sometimes acrid, of a yellow colour and greasy appearance; it has a disagreeable fœtid smell, it tinges the probe yellow; when the dressings are removed, they appear black as if stained or imbued with ink; and when a probe is pushed into the ulcer, the bone is felt bare.

The carious ulcer is most apt to occur on the shin or the outer ancle, as the tibia and fibula at these places are thinly covered; sometimes it occurs in the foot or wrist; it is then extremely dangerous, as the carpal and tarsal bones are so spongy in their structure, so grouped together, and so immediately in contact, that whenever one bone is attacked with ulceration, the caries spreads rapidly throughout the whole. An ulcer, combined with a diseased bone, is extremely difficult to heal; when it is healed, the irritation continuing, it soon breaks out again; and this repeatedly happens till the diseased bone is removed.

TREATMENT OF THE CARIOUS ULCER.

THE great art in the treatment of this ulcer is to remove the carious bone; when, if the powers of the constitution are vigorous, and the action in the parts strong, it will heal with the same facility as the simple ulcer; if not, it will assume the character which the action in the part and state of the system tend to induce, as the irritable, callous, or fungous appearance, and require the treatment adapted to one or other of these species of ulcers.

Bones exfoliate precisely in the same manner as the softer parts throw off sloughs, in consequence of irritation, the ulcerative absorption takes place, the effect of inflammation in the living parts. The same inflammation which makes the mouths of the vessels adhere, terminates in ulceration; to this there succeeds suppuration, and an effusion of coagulable lymph, which, assuming the form of granulations, force off the dead portion of bone; this process is always the effect of irritation, either excited by the dead portion of bone acting as a foreign body, or induced by art: hence it follows, that whatever excites this inflammation, must hasten the exfoliation of the bone. For the removal of diseased portions of bone, the actual cautery was much employed by the ancients, and the French surgeons of the present day are still very partial to it, but the generality of English surgeons have recourse to cutting instruments, as trephines and spring saws.

When this ulcer is situated over the center of any of the long bones, as upon the shin, the bone here is so compact that the disease is most commonly confined to the external lamellæ; it is then a very simple business, we may either wait till nature throw off the outer plates, or promote the exfoliation by art; but as the natural process is very slow and the cure tedious, it will be better to assist the exfoliation by art; and we find this best accomplished by perforating the outer layers of the bone with the central pin of the trepan, or with any small sharp pointed instrument; the perforations should be numerous, and carried to such a depth as to excite pain, which is generally followed by a slight effusion of blood; these perforations should be repeated every second or third day; they produce such a degree of inflammation as terminates in suppuration and the formation of granulations, by which the dead are extruded from the living parts. If any portion of bone is loose, its separation will be assisted by moving it from day to day, and pulling gently with a pair of dressing or dissecting forceps; or if the outer plate of bone is loose, it may be raised or turned off by inserting the end of a spatula under it, and raising it with a moderate degree of force. If a bone is carious to any considerable depth, it will be better to remove all the diseased portion by the application of the crown of a trephine, or to cut it entirely out by means of Mr Hey's saw, or even with the chissel and mallet; at all events it must be removed, as it is only by the removal of the carious bone, that this ulcer can be cured, and we know that bone is regenerated with the same facility as the softer parts; but we must remember, that although our object be to remove the carious portion of bone as speedily as possible, still we must act with some degree of caution; because if the granulations are not so completely formed below as to maintain the vitality in the bone, the second plate being exposed to the air before its circulation is fully established will also die, and must exfoliate, and thus the cure instead of being accelerated, will be greatly retarded.

If the diseased bone is not exposed to view, but so covered by granulations that it cannot even be exposed by an incision, the granulations must be removed by the scalpel or destroyed by escharotics, care being taken to repress their growth or prevent their regeneration, by stuffing the wound with dry lint. Whenever the carious bone is removed, the sore will assume the aspect of the simple, the irritable, the callous, or any other ulcer, according to existing circumstances, and must be managed agreeably to the rules laid down for the treatment of these respective ulcers.

6th,—HERPETIC ULCER.

There are peculiar eruptions of the skin which give rise to a virulent species of ulcer, denominated the Cutaneous or Herpetic Ulcer. These eruptive diseases more particularly pertain to the various species of herpes, and amongst the varieties of that disease, the herpes exedens of the Greek writers, the tinea capitis, and the mentagra of the Latins, give rise to an ulceration attended with great malignity. The mildest species of this ulcer, is that which is situated on the hairy scalp, and is produced in consequence of tinea capitis; the next in virulence, that which follows the herpes exedens, most commonly situated on the trunk, scrotum, perinæum, thighs, and legs; and the most virulent species, that which arises from the mentagra, attended with furfuraceous scales, or moist yellow scabs, situated on the upper lip, wings of the nose, and cheeks, called noli me tangere.

Although these cutaneous or herpetic ulcers possess different degrees of virulence from the ulcer on the scalp, to the noli me tangere; yet they have all one character, they are preceded by a pustular or scabby eruption, surrounded by a circumscribed inflammation more or less apparent, of a violaceous colour, not diffused but terminating abruptly in the sound skin. When the scabs which are generally yellow and moist fall off or are removed, there is seen a superficial irregular ulceration, with a violet coloured inflamed circle, discharging a serous, acrid, and fœtid matter, inflaming and corroding the parts with which it comes in contact. When the inflammation, which is of a specific character, is slight, there is but little pain; but when it is extensive the pain is acute and burning.

This ulceration in general has no tendency to go deeper than the skin, but rather to extend in a superficial direction, cicatrizing in the center, while it spreads along the inflamed edges; however, this is not always the case, for sometimes it spreads with all the rapidity and virulence of cancer, especially when situated on the upper lip, wings of the nose, and cheeks; not only involving the muscles and cartilages, but destroying the very bones.* Sometimes the ulceration spreads rapidly, sometimes slowly, and sometimes it remains for a long time stationary, then rapidly extends; but in general its progress is slow, continuing not only for months, but even years, and most commonly it does not penetrate deep, but extends superficially, cicatrizing in the center, while it creeps along the skin, and is always preceded by a specific inflammation.

---

* Lassus saw a little girl, aged about seven years, who had an ulcer of this kind, which destroyed first the wing of the nose, and then extended to the cheek and neck; the skin and the muscles were destroyed, and she died in the space of twelve or fifteen days, without procuring the least relief from any medicine taken internally, or applied externally. Sabbatier saw a case where this ulcer destroyed not only the soft parts, but also a part of the two maxillary bones, the proper bones of the nose, and the perpendicular plate of the ethmoid bone; and in August 1816, I saw at the Middlesex hospital, a remarkable case of the same kind in a poor German, under the care of Mr Cartwright. In this miserable creature, all the upper jaw, cheek bones, nose, and lower parts of the orbit were eaten away, the sight was completely gone, the right eye unsupported was hanging by its optic nerve, all the hard and soft parts being destroyed; the left eye was nearly in the same state, the ulceration was extending all over the forehead, and destroying the upper spongy bones. This poor man presented a horrible spectacle, which immediately recalled to my recollection the case of gun-shot wound related by Wiseman, where the whole face was shot away; he died a few days after I saw him.

This phagedenic ulcer, or noli me tangere, is nearly allied to the cancerous ulcer, and next to it is the most difficult to cure. Like the cancerous ulcer, it is frequently attended with an acute and burning pain, it seems to remain stationary for a longer or shorter time, and then extends with its former rapidity; the virus which it discharges, inflames and corrodes the neighbouring parts, and it frequently cicatrizes in one place while it spreads in another. But noli me tangere differs from cancer not only by being slower in its progress, but in another very essential particular; namely, it affects the neighbouring parts by immediate contact and not by the inflammation extending along the contiguous lymphatics, or by absorption. Hence when a patient dies of this disease, it is generally from its local effects, causing such a destruction of structure as is incompatible with life; whereas, cancer contaminates by absorption, and, independently of its local action, the patient dies from a constitutional affection, as of violent pain throughout the body, particularly acute in the back; cough, difficulty of breathing, scirrhus of the liver, and other visceral obstructions.

TREATMENT OF THE HERPETIC ULCER.

Writers have not considered this ulcer as strictly local, but have always combined constitutional remedies with the local treatment; the French, in particular, who are still humoral pathologists, recommend warm baths, sudorifics, antimonial and mercurial medicines, vegetable diet, purgatives, issues, &c., to expel the morbific matter existing in the constitution. The English surgeons have of late years greatly improved the treatment of this ulcer, by using caustics, as solutions of the argentum nitratum, and the preparations of arsenic; still they consider it so far constitutional as to require the exhibition of internal remedies, and for this purpose generally employ arsenic, purgatives, and antimonials; but as far as my experience goes, the disease seems to me to be entirely local, and if curable at all, it is by local remedies. The same method of treatment is equally applicable to the three different forms of the disease, only we must recollect that they are more or less easily cured, in proportion to their virulence; i. e. tinea capitis is the most easily cured, the herpes exedens next, and the noli me tangere the most difficult of all.

As the herpetic ulcer is produced in consequence of a specific inflammation terminating in virulent ulceration, our object, I apprehend, should therefore be to lessen that inflammation, by which we abate the virulence of the disease; to destroy the structure in which the diseased action is situated, by which we reduce it to a simple sore; or, to substitute one action for another, by which we put a check to the disease, by changing the mode of operation in the part.

The substitution of one action for another, as when we excite the vascular actions of the system in the cure of syphilis, when we inflame the urethra in gleet, or the skin in rheumatism, inflammation of the throat, joints, or internal organs, is a plan which we cannot apply here, as our present limited state of knowledge does not point out to us any particular way to effect it; unless we suppose that this is the principle on which the red oxide of mercury and other metallic salts, reduced below the caustic point, operate; or that blisters, when immediately applied to this ulcer as recommended by Richerand, prove serviceable. Therefore, as we know of no direct means to change the action in the part, we attempt the cure of this ulcer upon the principle of abating the inflammation, and destroying the structure in which the diseased action is situated; and as practical rules make a more distinct impression than loose and general reasoning, I shall shortly state what I conceive to be the most approved method of treatment, and what I have generally found successful.

To abate the inflammation and destroy the structure in which the diseased action is situated, are objects best effected by opiate and saturnine fomentations, and by caustics. In tinea capitis we direct the affected parts to be anointed every night at bed time, with an ointment composed of one drachm of the red oxide of mercury, carefully rubbed with a few drops of olive oil, till it is finely levigated, and then combined with half an ounce of resinous ointment, and half an ounce of simple ointment. Every morning the ointment and the scabs are to be carefully washed off with warm water and soap, and the ulcerated parts bathed three or four times during the day, with a solution of the muriate of mercury, in the proportion of ten or twelve grains to a pound of water. In the milder species of the disease, instead of the solution of the muriate of mercury, I use a warm solution of the sulphuret of potash, in the proportion of a drachm of the salt to four pounds of water, and with this solution I foment the head for 20 minutes or half an hour evening and morning.* This is the most simple form of the herpetic ulcer, the most easily cured, and this treatment generally proves successful.

---

* Baths of the sulphuret of potash, are much employed by Alibert at L' Hôpital St. Louis in the neighbourhood of Paris, for the various diseases of the skin; but at this hospital these baths are made by far too weak; they are used much stronger by Jadelot at L' Hôpital des Enfans Malades. His receipt is four ounces of the sulphuret of potash, dissolved in 20 gallons of water; this bath heated to 97° of Fahrenheit, Jadelot employs daily for the cure of the itch; but it is equally efficacious in

In the ulcer formed by the herpes exedens, stronger remedies are required ; we abate the inflammation by fomenting for half an hour evening and morning, with a piece of flannel steeped in a hot decoction of chamomile flowers and poppy heads, or hemloc leaves, or we use an opiate fomentation in the proportion of three drachms of opium, to two pounds of water ; we dress the sores evening and morning with the ointment of the red oxide of mercury, and before each dressing, pencil their surface, and most particularly their edges, with a strong caustic solution of the muriate of mercury, argentum nitratum or arsenic. The fomentations abate the inflammation, the caustics destroy the diseased parts, and the ointment changes the action and disposes the sores to heal ; the solutions of the muriate of mercury, the argentum nitratum, or the arsenic, should be made so strong as to have the full effect of caustics. When we use the solution of the muriate of mercury, it should be made in the

---

many other diseases of the skin. While he employs this bath for the cure of itch, he treats tinea capitis with an ointment of the hydro sulphuret of potass. The head is shaved, and the operation repeated every two or three days ; the scabs are carefully removed, the ointment applied daily, and the practice is generally successful.

proportion of one scruple of the muriate to half an ounce of water, and we promote the solution by adding a few grains of the muriate of ammonia. When we employ the lunar caustic, we dissolve a scruple of the salt in two drachms of water; and when we have recourse to the arsenic, we use it in the proportion of four grains to the ounce of water, which is not a saturated solution; although these solutions act as strong caustics when first applied, they lose their caustic effects by frequency of repetition, and become gentle stimulants only, so that the sore heals under their use; but if this does not happen, and the diseased structure is not entirely destroyed, we are under the necessity of encreasing the strength of the solution, so as to render it again caustic.

The third species of this ulcer, or the noli me tangere, is the most virulent, and sometimes its progress cannot be arrested by any means with which we are acquainted. In its management we therefore have recourse to the most active treatment; and here we find the argentum nitratum and the arsenic, preferable to the muriate of mercury; we foment for half an hour evening and morning with the opiate fomentation, which generally allays the inflammation, subdues the irritation, and mitigates the pain. We then dress the sores with the ointment of the red oxide of mercury, and at each dressing we pencil them well with the solution of the argentum nitratum, or arsenic.

By steadily pursuing this treatment, we are most commonly enabled to cure this inveterate ulcer; but it is frequently so malignant in its nature, and so nearly allied to cancer, that our best efforts prove abortive; we are not only unable to cure it, but even to stay its progress, and after days and nights of great misery, the patient is reduced to a deplorable condition, and dies a cruel death.

7th,—CANCEROUS ULCER.

Cancerous ulcer is a more aggravated species of the herpetic ulcer, or noli me tangere, and is the only local ulcer that may be said to be incurable; for although it has been sometimes cured by destroying the structure in which the carcinomatous action is situated, by cauteries or caustics, still it is so malignant in its nature, and so frequently baffles all our efforts, not only to cure it, but even to stay its progress, that I am afraid we must continue to rank it among the number of incurable diseases.

Cancerous ulcer presents itself under four different forms: 1st, As a primary disease in glandular structure immediately succeeding to the scirrhous or occult state, and denominated open cancer. 2nd, As a secondary or consecutive disease arising from the absorption of the cancerous virus, or from the inflammation extending along the lymphatics, to the neighbouring glands, and situated most commonly in those of the arm-pit, groin, and under the jaw. 3d, When the primary or original disease has been removed by operation, it sometimes happens, that after a longer or shorter period, the cicatrix throws out a serous matter which crusts upon the skin, and which, after being removed, or falling off, leaves an ulcerated surface, or small hard knobs appear in different parts of the adjacent sound skin; these knobs inflame and then ulcerate, the ulcer assumes the true character of the original disease, and manifests all the virulence of cancer. And 4th, It sometimes happens, that a small pimple or little excrescence appears on the skin, or in mucous membrane, as on the cheek, nose, lip, or tongue, which at last degenerates into a true cancerous ulcer; this, like that of glandular structure, is also a primary disease.

We formerly remarked, that the structures most commonly affected with cancer were the glands, mucous membrane, and the skin, particularly that of the face. When glandular structure is affected, we always observe two stages of the disease, that of a scirrhous hardness, attended with lancinating pain, and denominated occult cancer; and that of ulceration, called open cancer, characterized by a burning heat, a fœtid and acrimonious discharge, hard, irregular, and tumefied edges, with occasional hemorrhages from the eroded vessels. These two stages of the disease are best observed in the mamma, the testicle, the stomach, the rectum, and the uterus. 1st, In the stomach, rectum, and uterus, there is a combination of structure peculiarly liable to be attacked with cancer: namely, mucous membrane and glands; hence from the glandular structure of these parts, the ulcerated stage is always preceded by hardness or schirrosity. 2dly, The cancerous ulcer arising from the absorption of the virus, or extension of the inflammation along the lymphatics, is always preceded by an inflamed, swelled, and very painful state of one or more of the common lymphatic glands; here there is nothing like scirrhus, but the gland at once inflames, and proceeds rapidly to suppuration and ulceration, like the venereal bubo. The glands most commonly affected in this manner, are those of the groin from cancer of the testicle or penis, those of the arm-pit from cancer of the mamma, and those under the jaw from cancer of the tongue or lower lip. When any of these glands are affected with cancer, there is much more danger of a constitutional disease, than when the cancer is confined to its original seat, because the inflammation is extending along the lymphatics, or the virus is in the very act of passing into the system. 3dly, When the disease returns after extirpation, it manifests itself either in the line of cicatrix, most commonly by throwing out a serous exudation, which forms a crust or scab, and which is then followed by ulceration; or sometimes the adjacent skin becomes studded with small knobs or mottled spots which inflame and ulcerate. In whichever way it appears, it always begins in the skin, and by degrees spreads and involves the neighbouring structure, till it even affects the bones. This species of cancerous ulcer, most commonly presents itself after extirpation of the mamma and testicle. 4thly, When the ulcer appears in mucous membrane or in the skin, as in the tongue, the cheek, lower lip, or nose, it is generally preceded by a pimple or warty excrescence, which sometimes remains for a long time stationary, but from being picked or otherwise irritated, inflames, ulcerates, and assumes all the virulence of cancer.

Whether a cancerous ulcer begins in glandular structure, in mucous membrane, or in the skin, it possesses the following characteristic marks:—The ulcer is very deep, the granulations are hard, have a glassy appearance, and spring up in an irregular form, generally covered with a greyish-coloured slough; the edges of the sore are hard, tumified, ragged, and turned either inwards or outwards; this hardness is attended with a violacious coloured inflammation, stretching for some length round the edges, and extending as the parts assume the cancerous action; a thin cuticle or whitish pellicle frequently appears on its edges, as if it were inclined to cicatrize; the ulcer sometimes remains for a long time stationary, and then suddenly increases. It is attended with a burning heat and lancinating pain; and the discharge is a thin ichor, generally of a brown colour, of an intolerable stench, and possessing such acrimony as to inflame and corrode the neighbouring parts. It is frequently accompanied with profuse hemorrhagy from the eroded vessels, which greatly exhausts the patient. The absorbent glands, in the course of the lymphatic circulation, inflame and swell; and in its later stages, there is always considerable fever and constitutional irritation, attended with flying acute pains, sometimes fixed in the spine, cough, and difficulty of breathing, which soon terminate in a very miserable death.

TREATMENT OF THE CANCEROUS ULCER.

As we know of no process that can stop the action of cancer, or convert it into a healthy action, it follows that the cancerous ulcer can only be cured by a removal of the structure in which the diseased action is situated. This may be effected by the knife, and where the patient will consent, and the situation of the ulcer will admit of it, this is the preferable practice, because the operation is speedily finished, and there is less pain and less constitutional irritation than when caustics are employed; but the ulcer is frequently situated in parts where we cannot venture to employ the knife, or the patient (most frequently a female) is so timid, that she will not submit to it; we must in these cases have recourse to cauteries or caustics. Cauteries are so terrific in their name, and still more in their appearance, that surgeons generally employ caustics. The most celebrated of these applications are the caustic powders and pastes of Plunket, Guy, and Justamond, in England; and of Alliot, Frere Cosme, Chonet, and Rousselot, in France. All of them have arsenic for their basis, and it is upon this substance that their caustic properties depend; but it would appear from arsenic forming the basis of every secret remedy, that it was thought to possess some specific action in cancer, independently of its caustic quality. Indeed Justamond imagined, that in arsenic he had found a specific for cancer, as certain in its efficacy as mercury is for lues venerea.

Caustics cure cancerous ulcers of the skin more readily than those of the glands, and by occasionally touching the ulcer with solutions of the muriate of mercury, the argentum nitratum, or arsenic, we alleviate the pain, change the nature of the discharge, arrest the progress of the disease, and make the sore assume a better appearance; but to cure cancer, the caustics must be so strong as to destroy all the diseased parts. The caustic paste, which answers sufficiently well for this purpose, is made as follows; one drachm of the oxide of arsenic, two drachms of powdered opium, one ounce of the red sulphuret of mercury or cinnabar, and half an ounce of Armenian bole. These ingredients are rubbed in a mortar into a fine powder; the cinnabar and Armenian bole lessen the virulence of the arsenic, and the opium abates the pain. This form of the arsenical preparation is stronger than Plunket's, weaker than Justamond's, and about the strength of Rousselot's. When wanted for use, it is to be mixed up with as much yolk of eggs as will bring it to the consistence of thick paste; it is then to be spread upon the sore to the depth of the fourth of an inch. It produces considerable pain in the seat of the ulcer, and frequently sickness at stomach, vomiting, and colic pains, attended with quickness of pulse and considerable constitutional irritation. When we remove it, which we do on the day following its application, we find the edges of the ulcer inflamed and tumified, and the whole surface covered with an eschar. * By the continued use of fomentations

---

* The arsenical paste, or "pate arsenicale," is much used in cancerous ulcer by the French surgeons, particularly by Dubois at the Hospice de Perfectionnement. His receipt for the preparation and manner of applying it is as follows; Dragon's blood, an ounce; cinnabar, half an ounce; oxyd of arsenic, half a drachm. These ingredients are reduced into a powder, and accurately mixed; and when about to be used, this powder is made into a paste with saliva. The ulcer is first freed of scabs; the paste is uniformly applied on its surface about a quarter of an inch in thickness, and then covered with a cob-

and poultices, the eschar separates in a few days; and if the caustic has been sufficiently strong, all the diseased parts are destroyed, and have now separated with the eschar, leaving a clean healthy surface. If this does not take place, the caustic must be reapplied time after time till this object is effected.

By this treatment the cancerous sore sometimes heals, but most commonly it looks well only for a time; the diseased action returns and continues its ravages, till the patient, after a succession of miserable days and sleepless nights, exhausted by pain and fever, at last sinks under this cruel disease.

Arsenic was first used externally to destroy the cancerous structure by Fuschius in 1594. He applied it to cancerous ulcers in the form of a powder mixed with soot and snakeroot, but admits that the application of it was sometimes succeeded by symptoms of great constitutional irritation, such as fever, cold shiverings, vomiting, and faintings, which compelled him to give up its use. Fernelius relates the case of a woman with a cancer of the breast, to which a mixture of arsenic and corrosive sublimate was applied, and who died at the end of six days with all the symptoms of being poisoned. Hildanus gives

---

web. It begins immediately to act upon the ulcer, and, adhering to the eschar, forms a hard whitish crust, the separation of which requires from 12 to 42 days.

many instances of the fatal effects resulting from the application of arsenic in cancer.* Pibrac relates several cases where death followed the application of the muriate of mercury to cancerous ulcers.† Patients, both in England and France, have died from the application of arsenical preparations in cancer. Where the sore was extensive, I have seen arsenic, externally applied, produce the same effects as if the patient had swallowed it, such as vomiting, violent tormina in the stomach and bowels, great thirst, and considerable fever; and we know by experiments on animals, that death may be as certainly produced by the insertion of arsenic into a newly inflicted wound as when taken by the mouth, and that after death there will exist the same morbid appearances, particularly inflammation and gangrene of the stomach and intestines.

If the cancerous ulcer is small, little or no constitutional affection will follow the application of the arsenic; but if the ulcer is extensive, there is considerable danger. Roux imagines that the arsenic is prevented from passing into the system, in consequence of the violent irritation which almost immediately follows its application, producing a state of erethismus in the lymphatic vessels which suspends their inhaling action; and the irritation being soon followed by the formation of an eschar, will act as a farther barrier to the introduction of the poison;* but Roux, as well as other surgeons, has seen death follow the application of arsenic to a denuded surface.

---

* Hildani Opera, Cent. VI. Observ. 80. & 81.

† *Vid.* Memoires de l'Academie de Chirurgie, Tom. XI. p. 241. 12mo edition.

Arsenical preparations are more adapted to small and superficial cancers, such as those cancers of the skin, or the noli me tangere, than to extensive or glandular cancers. Although much used by the French surgeons, they have in this country been chiefly employed by empirics; but from the danger which attends their use, I am of opinion that they should be entirely interdicted. Where the knife is inadmissible, I should at all times prefer the actual cautery, which, on the whole, produces less pain and less constitutional irritation. The actual cautery will no doubt excite constitutional irritation proportioned to the extent of surface to which it has been applied, and to the irritability of the habit; but even where the surface is extensive, and the irritability great, it possesses one decided advantage over arsenical preparations, that the febrile action is merely that which arises from a burn free from the fatal effects of a potent mineral poison.

If we are resolved on a palliative plan of treatment, we foment twice or thrice a-day with solutions of opium, decoctions of poppy-heads, hemlock and henbane leaves, or warm saturnine lotions; we touch occasionally the edges of the sore with caustic solutions of the argentum nitratum, murias hydrargyri, or arsenic, and we fill up the cavity of the ulcer with dry charpee, which is preferable to greasy applications, as it absorbs the acrimonious discharge which this ulcer so abundantly secretes.

---

* Nouveaux Elemens de Medecine Operatoire, Tom. I. page 62.

SECTION II.

CONSTITUTIONAL ULCERS.

Constitutional Ulcers require a constitutional as well as a local treatment. No medicines applied to the sore will effect a cure, unless the general disease upon which the ulcer depends is eradicated from the system; and I may also remark, that, independently of the constitutional treatment, it is equally necessary to attend to the proper dressing of the ulcer, as upon this depends more of our success than is commonly imagined. In all constitutional ulcers, therefore, we combine a local with the general treatment.

1st,—SCROPHULOUS ULCER.

Under specific inflammation, I have offered some observations on Scrophula; the remarks which I have now to make, therefore, on the Scrophulous Ulcer, will be but few, and must be viewed as a continuation of what has been already said. Those loose and moveable tumors, which so frequently appear in scrophulous habits, although they often remain long stationary, and after a longer or shorter period, disappear spontaneously, yet they sometimes inflame and proceed slowly to suppuration. When the abscess is formed, whether it bursts spontaneously or is opened by art, it is succeeded by an ulcer of a peculiar character, denominated the Scrophulous Ulcer. This ulcer is generally deep, the edges thin, sometimes painful, but in general not very sensible, and surrounded by a faint red or bluish inflammation. The discharge is at first a thin serum mixed with curdly flakes, and of a sour smell; but in process of time it becomes glutinous, and the sour smell disappears; sometimes the sore shoots out a glassy fungus, and sometimes the skin round the ulcer is separated from the subjacent cellular substance. It generally shews no disposition to heal, and frequently does not seem inclined to get worse, but remains stationary for months or even years.

All suppurating glands and joints are difficult to heal, especially when connected with scrophula; and scrophula is more or less dangerous, according to the parts of the body which are affected, and the period of life at which it appears. It is always more dangerous when it attacks the joints, from the bones becoming carious; and it is more difficult to cure when it appears in early infancy than towards the age of puberty, because scrophula is a disease of relaxation and debility; and as the patient advances in life, and the powers of the constitution become strong, it gradually vanishes, frequently disappearing spontaneously at the age of puberty.

TREATMENT OF THE SCROPHULOUS ULCER.

The treatment of Scrophulous Ulcer, like that of the other constitutional ulcers, must be divided into General and Local. Our general or constitutional treatment is just what has been already recommended for the cure of scrophula. Referring, therefore, to what has been already said under that head, and pursuing the plan therein recommended steadily and vigorously, we may now confine our remarks to the local treatment of scrophulous ulcer.

There are two states under which the Scrophulous Ulcer presents itself, the Inflamed and the Indolent; and our local treatment must be adapted to whichever of these states the ulcer assumes. When there is much inflammation, and tenderness or irritability, we employ warm fomentations as recommended in the treatment of the irritable ulcer, and dress the sore with the ungt. ceruss. acet., Goulard's cerate, or cold saturnine lotions. When the inflammation is gone, and the ulcer presents itself in a state of indolence, we must increase the action; and to accomplish this, the best dressing I conceive to be the ungt. oxid. hydr. nitr. rubr., and gentle compression. Compression, in this stage of the scrophulous ulcer, is of infinite use; it gives great support, and disposes the sore to heal.

If there are none of the joints affected, no carious bones, and the powers of the constitution not much enfeebled, but especially if the patient is verging towards the age of puberty, by combining the tonic plan with this local treatment, we generally succeed in curing scrophulous ulcers; but if the patient be very young, much debilitated, and, above all, if there be any visceral obstruction, we are not only unable to cure the ulcers, but the patient becomes hectic, grows daily worse, and at last sinks under the disease.

2d,—SCORBUTIC ULCER.

The term Scorbutic Ulcer has been greatly misapplied by writers in surgery. A variety of ulcers connected with diseases of the skin, have been commonly classed under this head. As these ulcers have no relation to true scurvy, but belong to the class of cutaneous diseases, it is evident that the term has been improperly applied. What we have at present to consider is a constitutional ulcer, existing in, and arising from a habit tainted with scurvy. This ulcer either occurs in consequence of a cut, scratch, abrasion of the skin, or some other accident, in a habit so tainted; or ulcers which have formerly existed assume this appearance from the supervening of a constitutional scorbutic affection.

By the labours of Drs Lind and Milman, but more especially of Trotter, we have acquired a more accurate knowledge of the disease; and by the unwearied exertions of the latter, while physician to the Channel Fleet, with the joint cooperation of the naval surgeons, scurvy has been nearly banished from the Navy. This disease has been rendered not only no longer formidable, but, during the last war, and the latter part of the one immediately preceding, it has been hardly known. In the years 1799, 1800, and 1801, there were not received into Haslar Hospital, the greatest marine hospital in the world, six cases of true scurvy; whereas in former wars, whole wards were appropriated for the disease. During late years, it has been still less known; and few cases now appear at the naval hospitals, as its occurrence on board is either entirely prevented by the plan of diet, cleanliness, ventilation, and other wholesome regulations which have been introduced into the British Navy, or as soon as it appears it is speedily cured.

Scurvy first manifests itself by paleness and sallowness of countenance, partaking of a leaden hue, with dull eye; the skin over the whole body becomes rough and livid, forming the true cutis anserina; the legs swell, the gums become tumid, spongy, and bleed upon the slightest touch; the breath is fœtid, the tongue parched, and there is a great desire for acid fruits. The patient complains of pains in different parts of the body, is easily fatigued, has great difficulty of breathing, and feels extremely weak. The disease, if not counteracted in this stage, rapidly advances; an uncommon hardness of the muscles takes place in different parts of the body, particularly in the legs. This hardness generally presents itself in the second stage of the disease, but sometimes it occurs among its early symptoms, and is always attended with a contraction of the tendons of the affected muscles. This contraction and hardness are particularly apparent in the tendon of the biceps brachii, and in those of the ham. The respiration now becomes hurried upon the slightest exertion; the debility is so great, that the patient faints in the erect posture; and it has occasionally happened, that from hurried movements, from exposure to cold upon deck, or in boats going to the hospital, they have suddenly expired. The gums are now so rotten, that they are detached in pieces, and the teeth drop out; dark-coloured spots appear in various parts of the body like petechiæ from effused blood; a distressing diarrhœa comes on, attended with a very fœtid smell; and hemorrhagies, of a dark colour, take place from the nose, mouth, anus, and generally from the whole mucous membranes; the tongue is now completely crusted and black, but the pulse commonly remains regular, and the appetite good till the last. The cicatrices of old ulcers break out, and the slightest bruise or scratch produces a new one of a peculiar complexion.

It is natural to think that all ulcers will partake of this vitiated state of the habit. Accordingly, both old ulcers and those recently produced lose their healthy granulating appearance, assume a dirty red colour, with pale and livid lips; they are soon covered with a clot of dark loose coagulated blood, which is removed with some difficulty, and when removed, is in a short time reproduced, so as to exhibit the same appearance at next dressing. This is termed by the sailors Bullock's Liver, and the discharge is a thin fœtid sanies. The loose coagulated blood upon the surface of the sore, the thin fœtid discharge, the livid edges, with the adjoining skin rough, pale, or rather livid, and the limb swelled and œdematous, form the true character of the scorbutic ulcer.

At one time, scurvy was imagined to be a disease peculiar to cold countries, to a sea-faring life, and to arise from a diet of salted meat; and it was thought to depend upon debility arising from this diet not imparting a sufficiency of nourishment, but this is now known to be a great mistake. Cold may be a predisposing cause, but its presence is not requisite to produce scurvy, as the disease has been known to occur in a warm climate; neither is it peculiar to a sea-life, for it has been well marked, and often observed on land, particularly among prisoners and in besieged garrisons where the troops were ill fed, and where there was a deficiency or total want of fresh vegetables. It is equally certain that scurvy is not necessarily produced by salted animal food, for it has occurred on board of Indiamen on a diet of rice, and Dr Trotter saw it appear in a Guineaman among the slaves, where no animal food, either salted or fresh, was used; they lived upon a diet sufficiently nourishing, consisting of beans, rice, and Indian corn.

Scurvy seems to arise from the want of fresh vegetables, or rather of the principle which fresh vegetables impart to the blood; and where there is an abundant supply of fresh vegetables and fruits, the disease never occurs, although salted animal food is habitually used. Again, if this recent vegetable principle be withdrawn, the disease in a short time makes its appearance, whether the diet consists of fresh animal food, or merely of rice, beans, or Indian corn, without animal food at all. In fact, scurvy is produced in any climate, whether cold or warm, on land as well as at sea, and by any diet, whether salted or fresh, animal or vegetable, if the recent vegetable principle be withdrawn.

In this disease, there is a particular state of blood chiefly marked by its dark colour and want of coagulation; and it is observed, that this state of blood is more or less readily produced by animal food, impure air, bad water, muriate of soda, and alkalis. These must, therefore, be reckoned exciting causes of scurvy. Again, it is observed, that the subjects most liable to be attacked are those who have been previously enfeebled from disease, from fatigue, as during long marches or gales of wind; those who drink much spirits, who are indolent, or who labour under depression of spirits, or from any cause that lowers the powers of life; debility, fatigue, excess of spirituous liquors, indolence or want of exercise, and other weakening and depressing powers, must therefore be accounted the predisposing causes of scurvy.

TREATMENT OF THE SCORBUTIC ULCER.

As scurvy seems to arise from the abstraction of the principle which recent vegetable matter imparts to the blood, it follows, that the restoration of this principle will cure the disease. Accordingly, we find scurvy very readily cured by a diet of fresh vegetables, by unripe fruits, and by vegetable acids, particularly the citric and malic. This vegetable principle restores to the blood the florid colour and powers of coagulation which it had lost, and to the muscular fibre its tone and contractility.

It has been long known that fresh vegetables, vegetable acids, and even mineral acids will cure the scurvy; hence elixir of vitriol was recommended by Huxham; sour kraut, which is a species of pickled cabbage, by Dr Lind; and essence of wort, and the infusion of malt by M^{c}Bride; all these articles have been in succession supplied to the navy, but found to be very inferior in efficacy to fresh vegetables, and acid fruits. Of these fruits such as contain the citric and malic acids are the most powerful, as lemons, oranges, apples, gooseberries, &c., and these in their unripe state are found to cure more quickly than when ripe. By supplying a ship's company occasionally with fresh succulent vegetables, as cabbages, onions, cellery, or lettice, and unripe acid fruits, more especially with the citric acid, sometimes by itself, and sometimes in the form of sherbet or lemonade, conjoined with pure water and a free ventilation, all appearance of scurvy may be entirely prevented, although the ship be kept long at sea, and the crew fed on salted animal food. In Captain Cook's ships, the scurvy was little known from the supplies of fresh vegetables and frequent renewal of the water. When the disease does occur, it may be cured on board as readily as on shore, by the same mode of treatment carried to a greater extent, more especially by liberal doses of the citric acid. This acid ought not only to be used in the form of lemonade for common drink, but given in its pure state in doses of half an ounce three or four times a day.

This plan of treatment for the cure of scurvy, must also be followed for the constitutional cure of scorbutic ulcer. The local treatment so immediately depends upon the constitutional, that the latter must precede the former for some time, before any local application can be of service in changing the aspect of the sore; we may in the meantime, wash the ulcers with lemon juice and water, or a piece of lint dipped in lemon juice may be kept constantly applied; or, what is still preferable, the turnip or carrot poultice, or the fermenting yeast poultice may be used, and repeated three or four times a-day till the ulcer looks clean. The sore is then to be dressed with the ointment of the red oxide of mercury to keep up the action, and as soon as it begins to granulate and assume the healthy appearance, it must be treated either as the simple ulcer, or according to whatever other form it may assume.

Among the lower orders of society, residing in low, damp, and ill-aired situations, and living chiefly upon salted fish, with few or no fresh vegetables, a true scorbutic ulcer appears, although not so strongly marked as that which I have just now described; it is of a dirty red colour, covered with dark coagulated blood, as if the patient had received a blow upon the ulcer; it has livid edges, the skin is rough and bluish, the legs swelled and œdematous, the countenance of a leaden hue, the gums spongy and bleeding, and the breath fœtid. This ulcer is to be treated precisely in the same manner, as that which occurs in sea-scurvy, the constitutional treatment, fresh vegetable diet, unripe fruits, especially lemons, pure water, and free air; and the local treatment, the carrot or fermenting poultice in the first stage, the ointment of the red oxide of mercury in the second stage, and when the ulcer assumes a healthy appearance, simple dressings.

3d,—VENEREAL ULCER.

Venereal Ulcers are of two kinds, primary and secondary. The primary ulcers usually called chancres, arise in consequence of the application of syphilitic virus, and generally present themselves upon the parts of generation in either sex, most commonly upon the glans penis, or on the inside of the foreskin in the male, and on the inside of the labia, upon the nymphæ, or in the entrance of the vagina in the female, where the cuticle is thin, and the surface a mucous membrane; here they arise in consequence of impure connection; but we frequently see the same kind of ulcers upon the lips or tongue, communicated from kissing an infected person. The consideration of these primary venereal ulcers and their consequences, I have already fully discussed when treating of lues venerea, and shall only at present offer a few observations on the secondary venereal ulcer, as springing from a general contamination of the system, constituting a constitutional ulcer, possessing several specific properties, and incurable till such time as the virus is eradicated from the habit. What I have already offered on the nature and treatment of syphilis in general, also embraces the consideration of these secondary ulcers, so that I shall at present only briefly give the character of the constitutional syphilitic ulcer, with a few remarks on its treatment.

The secondary venereal ulcer differs from the primary in this essential point: viz. that the primary ulcers are always local at first, and the disease becomes constitutional only from the absorption of the virus. Whereas, the secondary are always constitutional, and never local, depending upon a general poisoned state of the system.

I enumerated ulceration as one of the terminations of inflammation, and remarked that this termination generally occurred in skin and mucous membrane. These textures are also the common seat of the venereal ulcer, which is nothing else than one of the terminations of a specific inflammation; but there are also particular structures which are the peculiar seat of certain morbid actions, or particular diseases are apt to attack one structure of the animal body more readily than another. Thus the glandular system is the general seat of cancer; the glandular system and the joints the common seat of scrophula; and the mucous membranes and bones, the usual seat of syphilis. When the secondary venereal ulcer appears in consequence of inflammation, we find it most commonly in the mucous membranes, as in the throat, within the mouth, in the schneiderian membrane; within the rectum, and under the foreskin, in the inside of the labia, or in the entrance of the vagina, in the skin in general, and in those bones which are thinly covered, as in the skull, bones of the nose, palate bones, clavicles, and tibia in the shin; but if there has existed an ulcer, previous to the general contamination, wherever situated, or if an ulcer occurs in consequence of accident, it will immediately assume the peculiar character of a venereal sore.

When the venereal ulcer occurs spontaneously, it is always preceded by inflammation; the inflammation is at first diffused, and of a dusky brown or copper colour; a number of small itchy pimples appear, or the inflamed surface throws out a furfuraceous crust, and, like herpes, it becomes more inflamed; the inflamed parts grow very tender, the skin cracks and throws out an ichor, the crust loosens and separates, leaving the parts underneath ulcerated; the ulceration spreads, becomes deeper, and acquires a marked character. The ulcer is deep, with irregular and indurated edges, of a greyish colour, and surrounded by a copper coloured inflammation; the discharge is commonly thick and viscid, but sometimes thin, extremely acrid, very fœtid, and of a yellowish green colour; the ulceration extends sometimes quickly and sometimes slowly; it cicatrizes in one part, while it spreads in another, and it is commonly attended with little pain, indicating a want of action. An ulcer with these appearances is always more than suspicious; but our suspicions are confirmed, when pains in the bones are also present, chiefly during the night when warm in bed, when there are nodes or blotches, with other symptoms of lues, and when the history of the case appears to correspond.

TREATMENT OF THE VENEREAL ULCER.

The constitutional treatment of the venereal ulcer is by mercury, and the mercury should be administered in the same quantity, and with the same rapidity as has been already recommended in the general treatment of lues, more especially as the system in secondary venereal ulcer is completely contaminated. Mercury taken internally or exhibited by friction or fumigation, is not only the constitutional treatment of the secondary venereal ulcer, but of all the other forms of the disease; but this ulcer, like the other constitutional ulcers, also requires a local treatment, and that for three very obvious reasons: 1st, It should be the object of the practitioner to heal every venereal ulcer, as speedily as possible, otherwise the system must be kept perpetually infected from the absorption of fresh virus generated by the ulcer; and we find when there are many ulcers, that it is frequently impossible to cure the disease, as the constitution is kept continually contaminated from the renewed absorption. 2dly, As the venereal ulcer possesses little action, its cure may be greatly accelerated by such applications as will excite the action in the part: and, 3dly, From the scab which is sometimes formed upon ulcers of this description, we frequently find it impossible to cure it without local applications. When the ulcer is disposed to crust, or possesses little action, the best application is the resinous ointment or basilicon, combined with the red oxide of mercury, in the proportion of one drachm of the mercury to an ounce of ointment; in the next stage, with a clean surface and callous edges, we either pencil it with a strong solution of the argentum nitratum, or touch it with the sulphate of copper, or dip a little lint occasionally in a solution of that salt and apply it; 'and when the ulcer has lost every venereal appearance and is healing rapidly, perhaps it may suffice to dress with dry lint. Although the ulcer be healed, we must not consider the virus as eradicated from the system; it will therefore be prudent to continue the mercury for such a length of time as to ensure a perfect cure. The length of time requisite will depend on the previous duration of the disease.

4th,—MERCURIAL ULCER.

The effect of mercury is to quicken the pulse, raise a febrile action, render the system irritable, and excite the salivary glands to an encreased secretion. Under this operation of mercury venereal sores heal, and the virus is eradicated; but if this state of excitement be long continued, a new action commences, and under its influence venereal sores not only change their character, but refuse to heal;

new sores appear of a peculiarly irritable type, and possessing all the virulence of the true phagedenic ulcer. This ulcer has been called the mercurial ulcer, it possesses a high degree of irritability, spreads rapidly, and is extremely painful; in fact it is just the local irritable ulcer in a more aggravated form, depending upon a constitutional or specific action, induced by the long continued or imprudent use of mercury. The most simple form under which the mercurial ulcer appears, is in those ulcerations which occur upon the sides of the tongue, inside of the cheeks and gums, when the mouth is much affected under the operation of mercury; but shortly after the mercury is given up, the febrile action ceases, the salivation stops, and these ulcers heal of their own accord.

The mercurial ulcer possesses the following marked character, whether it appears spontaneously during a course of mercury, or whether the venereal sore changes to the mercurial: The ulcer is much inflamed, is irritable, extremely painful, and encreases rapidly in size; it has irregular, hard and inflamed edges, and the inflammation, which is of a specific character, extends to the adjacent skin; the sore discharges a thin acrid virus, which corrodes the neighbouring parts, and, like the noli me tangere and cancerous ulcer, is frequently covered with a thin pellicle or cuticle in one part, while it is spreading in another. When the ulcer is thus spreading, its edges are inflamed, painful, and raw, like a newly inflicted wound; but sometimes the inflammation, which is often considerable, terminates suddenly in gangrene, and sometimes in the course of a few days, the whole or the greater part of the penis sloughs off; or if the ulcer be situated in the seat of a bubo, the sloughing is so extensive as frequently to denude the femoral artery, and endanger the life of the patient. I recollect in a strong muscular man, where an ulcerated bubo took on the mercurial action, the inflammation was extensive, and the sloughing and destruction of structure as rapid as if it had been produced by hospital gangrene; in a few days there was formed a large deep ulcer, the pain was so excruciating that no opiates could appease it, and the patient cried night and day.

When the mercurial ulcer appears, it either occurs after the venereal sores have healed, beginning like a slight excoriation, but which in a short time assumes the character of the irritable ulcer, and spreads rapidly; or after a space of time, more or less long, a venereal sore, for which we are using mercury, becomes stationary; it not only makes no progress in healing, but in a little begins to inflame and become painful; it then spreads, and assumes a new character. The mercurial ulcer thus, in general, appears in the same parts which are the seat of the venereal, and the one ulcer is very apt to be mistaken by the inexperienced practitioner for the other. Under these circumstances, if the mercury be pushed with this mistaken view, the irritability is increased, the sore spreads with all the rapidity and virulence of cancer, and the patient runs the risk of losing his penis, palate, nose, or even his life. This has actually happened, and the unhappy patient has been mutilated from the imprudent use of mercury as completely as from the ravages of the venereal disease. It is therefore of considerable consequence to make a just diagnosis of the case. The venereal ulcer, in general, possesses little action, has little pain, is surrounded with a dark or copper-coloured inflammation, and has a greater tendency to eat deep than to spread superficially; whereas the mercurial ulcer possesses a high degree of action, is much inflamed, very painful, discharges a thin corroding ichor, and spreads rapidly; but, independently of these circumstances, we may conclude with great certainty that an ulcer is mercurial, when it either appears or increases in size at the time that the patient is completely under the influence of mercury, that is, when there is great action in the system. The most common seat of the mercurial ulcer is upon the tongue, inside of the cheeks or lips, or upon the gums; next in the throat and nose; then upon the glans penis and prepuce, or the inside of the labia pudendi, but it may appear in any other part of the body, more especially where there has been a venereal sore. When the mercurial ulcer does appear, it is no proof that the venereal virus is completely eradicated from the habit; the action of the latter may be only suspended; accordingly, the venereal action sometimes returns after the mercurial irritation ceases, and the farther use of mercury is required.

All those preparations of mercury, which most readily excite the vascular actions of the system, are most apt to induce the mercurial disease, and these are the saline preparations (particularly the corrosive muriate), and fumigations. We know that mercury does not cure lues from the quantity used, but from its peculiar operation on the system, it produces a high febrile and inflammatory excitement; and there are some constitutions so irritable, that mercury soon excites this violent action. These are the constitutions in which the mercurial disease is most apt to occur.

TREATMENT OF THE MERCURIAL ULCER.

The cure of this ulcer, like that of the scrophulous, scorbutic, and venereal ulcers, resolves itself into the constitutional and local treatment. In the constitutional treatment, our first object is to desist from the further use of the mercury; and if the disease be in its early stage, the irritation ceases, and the patient gradually recovers without any further means. If the patient be strong, and the febrile action violent, it will be advisable to abstract some blood from the general system. This must be done in proportion to the violence of the action and the strength of the patient, keeping in mind that the secondary effect of mercury is to produce great debility. Blood-letting is, therefore, more adapted to the early stage of the mercurial disease, and to plethoric habits, than to enfeebled constitutions. The patient must abstain from wine, spirituous and fermented liquors, and solid animal food, chiefly subsisting on milk, jellies, weak soups, and vegetables; the bowels must not only be kept freely open, but he must be repeatedly and briskly purged by means of saline cathartics, and the action of the skin increased by drinking of the compound decoction of sarsaparilla, with a little antimonial wine, and avoiding every source of constitutional irritation. The general action may be also considerably abated by occasional doses of hyoscyamus, digitalis, cicuta or camphor; but opium increases the action unless given in large doses, as its first effect is to stimulate; its use, therefore, does not appear to be well adapted to the mercurial ulcer.

This is the constitutional treatment which promises to be of most efficacy in the cure of the mercurial ulcer; and as this is merely the irritable ulcer in a more aggravated form, induced by the action of mercury, it is evident that the local treatment must be precisely the same with that which has been already laid down for the treatment of the irritable ulcer; namely, warm opiate fomentations and anodyne decoctions, warm saturnine lotions, and warm emollient poultices. When the irritation has subsided, we may apply saturnine lotions or Goulard's cerate; and when it is entirely gone, simple dressings.

CHAP. V.

WOUNDS.

SECTION I.

WOUNDS IN GENERAL.

A WOUND is a solution of continuity from external violence recently inflicted, and therefore commonly attended with bleeding in a greater or less degree. The general, and perhaps the best practical division of wounds, is into, 1st, Incised Wounds: 2d, Punctured Wounds: 3d, Poisoned Wounds: 4th, Lacerated and Contused Wounds; and, 5th, Gunshot-Wounds. The last two divisions of this arrangement have the same external character, and require a similar mode of treatment; but as gun-shot wounds differ from contused wounds in the peculiar manner in which they are inflicted, in frequently having a foreign body lodged, and in belonging rather to the province of military and naval than of domestic surgery, they are generally treated of under a distinct head.

All the wounds now enumerated are healed either by immediate union, which, in surgical language, is called " healing by the first intention," or by suppuration and granulation, which is denominated " healing by the second intention." Incised wounds are the ones best adapted for attempting adhesion, and where we are generally successful; but cases may occur where we are compelled to abandon this mode of cure, and resort to that of suppuration and granulation, such as where there is so great a loss of substance, that the opposite surfaces cannot be brought into contact, where the wound is poisoned, or where we are forced to suppress a hemorrhage by compression within the wound, or by the actual cautery.

Wounds are more or less dangerous in proportion to their extent, situation, the period of life, state of the constitution, and cause by which they are produced. The immediate danger in all wounds is hemorrhage, which most frequently occurs in incised wounds, for in these the vessels are fairly cut, and bleed with open mouth; it is less apt to ocur in lacerated and gun-shot wounds, because the general contusion produces a palsied state of the vessels, which suppresses the bleeding.

The agents upon which the whole operations of life depend, are the vascular and nervous systems, and in wounds it is always through the medium of these great powers that the animal economy becomes deranged. If the wound is of considerable extent, or situated in any of the great cavities, although inflicted by a clean cutting instrument, there follows what has been called symptomatic fever, which is an increased action of the whole vascular system. All the secretions are suppressed, the operations of the sensorium become disturbed, and the whole actions of the system so deranged, that it often terminates in death. Again, when a nerve is injured, which is frequently the case in punctured, lacerated, and gun-shot wounds; the nerve sometimes inflames, which is soon followed by general spasms and universal convulsion, which are still more fatal than increased vascular action. It is also through the medium either of the vascular or the nervous system, that poisoned wounds act on the animal economy. All those deleterious powers, which require a length of time to produce general derangement, are conveyed by means of the absorbent and circulating systems, and all those which produce an almost instantaneous effect, are transmitted by the medium of the nerves. Thus the bite of a rabid animal does not induce a constitutional affection for many days, sometimes weeks, and even months; while the bite of the cobra de capello kills in a few minutes; the poison of the former passing through the whole of the circulating system before it produces constitutional derangement; that of the latter at once acting through the medium of the nerves.

MEANS OF SUPPRESSING TRAUMATIC HEMORRHAGE.

The immediate danger in all wounds is the hemorrhage, and this is always in proportion to the size and number of the wounded vessels. The first object of the surgeon, therefore, before dressing the wound, is to have recourse to those means which are requisite to stop the bleeding. If the vessel is large, and situated in one of the extremities, he immediately applies the tourniquet, above the wound, betwixt it and the heart; and till this instrument can be applied, he should endeavour to check the hemorrhage, by strongly compressing the vessels at the wounded point. If the wound is small, such as that which is inflicted by the point of a pair of scissars or a penknife, merely applying the point of the finger upon the wound will be sufficient. If the wound is large, the compression must be more broad and general, and requires us to introduce a firm compress of linen, or a piece of sponge. The tourniquet is merely a temporary expedient for suppressing hemorrhage, and we cannot continue its application long, for fear of cutting off the supply of blood; the limb would soon fall into gangrene. As soon, therefore, as the bleeding is checked by the tourniquet, we deliberately reflect upon the best means of securing the vessels, and in such a manner as to put a permanent stop to its return.

The permanent means of suppressing hemorrhage are four; Styptics, the Actual Cautery, Ligature, and Compression.

Styptics.—Styptics act only on the smaller orders of vessels, chiefly the capillaries. The principal articles of this class are alkohol, strong solutions of the sulphates of iron and copper, diluted mineral acids, and the eau de Rabell, which consists of alkohol and sulphuric acid, and which, when used, requires to be diluted with a little water. Styptics were at one time in great vogue in France, and even so late as the time of Desault, Colophany was much used at the Hotel Dieu to suppress homorrhage in the smaller orders of vessels.

We never have recourse to styptics but in the most superficial wounds, and then it is to check the bleeding; not so much on account of any danger which it might produce, as of the impediment which it opposes to the process of adhesion. In wounds in which no distinct artery is seen; but where the bleeding is considerable, which is always the case in children, we use the weaker styptics. We wash the wound with cold water, or with vinegar and water, exposing it freely to the air; or we pour upon it a little of the compound tincture of Benzoin. Where these means do not effectually suppress the bleeding, no styptics can be trusted, the case requires either the ligature or compression.

Actual Cautery.—The Actual Cautery although much used by the ancients, is seldom employed in modern practice; its use is restricted to cases of hemorrhage within the mouth, as after the removal of tumours from the palate, or in such wounds of the ranine arteries as cannot be secured by ligature. The actual cautery is also sometimes required to suppress hemorrhage from the surface, or after the partial detachment of fungous tumours, where neither compression nor styptics are of any avail.

Ligature.—The most powerful and certain means of suppressing hemorrhage, are the ligature and compression; but the united experience of all practical surgeons, Continental as well as British, declares that the ligature, whenever it can be used, is the preferable method. It is preferable to compression, because it does not interfere with the cure of the wound by the first intention, because it is the least painful, and least productive of inflammation in the neighbouring parts; and because it more effectually shuts the bleeding vessel, while it more certainly excites that inflammation in the artery by which it is permanently closed. There are two ways of applying the ligature: by the needle, and by the tenaculum. When we use the needle, we always include a considerable portion of flesh along with the artery; when we employ the tenaculum, our aim is to comprehend no parts besides the artery, and the loose cellular substance with which it is surrounded. The tenaculum is undoubtedly preferable to the needle, for the following reasons: It gives less pain to the patient; the inflammation which it induces, is confined entirely to the artery where a certain degree of inflammation is required; whereas, when the needle is used, the ligature, long in coming away, excites considerable inflammation and suppuration in the surrounding parts. The tenaculum is less apt to excite nervous symptoms, and it is always more certain in its operation than the needle, because when much flesh is included in the ligature, the sides of the artery are sometimes merely laid together, and although the pressure may be sufficient to suppress the hemorrhage for the time, it is not so great as to excite inflammation in the inner coat of the artery, by which it will be permanently closed; hence when the flesh fades under the ligature, the noose becomes loose, and the hemorrhagy is sometimes reproduced. This is the reason that when we attempt the cure of aneurism, or the obliteration of an artery by compression, we are always longer in succeeding than when we employ a ligature. When the bleeding vessel lies deep, we are forced to use the needle, but in an exposed and open wound, for the reasons now stated, we always prefer the tenaculum. We take a ligature proportioned to the size of the bleeding artery, we form a noose upon it by passing one end of the ligature through the other once. The tenaculum is passed through the noose, and struck into the extremity of the bleeding vessel in such a manner, that the cellular substance surrounding it may be drawn out and included in the ligature. This should be particularly attended to, otherwise, if the artery alone is included, and the ligature pulled with any degree of firmness, it invariably cuts it, and the vessel bleeds, either instantly, or, what is more dangerous, a few hours after the patient has been laid in bed. When the artery has been drawn out with its surrounding cellular substance, the assistant passes the noose over it, and by embracing it with his two fore-fingers, pulls it slowly and cautiously till he ties the artery, which he does with a moderate degree of tightness, recollecting that the ligature may be pulled much more firmly when the cellular substance is included, than when the artery is naked. The assistant should now make a second knot on his ligature for greater security, and this should always be done before the tenaculum is withdrawn.

When the artery is only wounded, but not fairly divided, or when the vessel is large, we are directed to put a ligature on the lower orifice, as well as on the upper; as it is believed that the anastomising branches bringing the blood again into the main trunk, will renew the hemorrhage. This direction may be proper, although I believe that it has its origin rather in theoretic views of the arterial anastomoses, than in practical observation. I have seen one ligature betwixt the wound and the heart completely suppress the hemorrhage, even in large arterial trunks, and I believe this will in general he found to be the case.

Compression.—Compression is less secure than the ligature, still many cases occur where we are forced to have recourse to this mode of suppressing hemorrhage. Compression may be made either without or within the wound; the former is preferable when it can be used, as it does not interfere with our intention of closing the wound. When the bleeding is from a vessel belonging to the inferior order of arteries, and when a bone is situated underneath against which the vessel can be firmly compressed, instead of enlarging the wound to apply a ligature, it will be sufficient to apply a firm compress and bandage. This practice will answer in wounds of the temporal artery, and anterior tibial on the fore-part of the foot; but it is in cases where the ligature is inadmissible, that we principally have recourse to compression, such as in bleedings from behind the angle of the jaw, or in the axilla where the vessels are deep and numerous, in wounds of the intercostal arteries, the internal pudic, the palmar arch, or plantar arteries, and from the alveolar arteries after the extraction of a tooth. The greater number of these vessels are so deeply situated, that much difficulty and danger would attend any attempt to include them in a ligature. In such circumstances we have recourse to agaric or sponge; they both act on the same principle of absorbing moisture and encreasing the compression as the blood escapes. Sponge is used by the generality of English surgeons, and perhaps is preferable; agaric by many of the French surgeons, particularly by Dubois. A ligature should always be attached to the sponge before it is applied, and with this the sponge should be removed, as soon as suppuration is established in the wound; the arteries are by this time secure, and if we should allow it to remain longer, the granulations would shoot into its pores, so that it could not be disengaged without considerable difficulty, and some hemorrhage. When we use the sponge in a deep wound, in such situations as the axilla, or behind the angle of the jaw, we do it in the following manner: we take a piece of firm dry sponge, with a ligature attached to it; we apply it over the bleeding vessels; over this we lay compresses of linen or charpee in succession, till we come to the level of the integuments. And we then secure the whole by means of two rollers: the first roller which is to remain, should be applied with a moderate degree of firmness; but the second should be pulled pretty tight, and removed at the end of five or six hours, when the immediate danger is over. A second roller thus applied with some degree of tightness, will be found very useful in bleeding wounds in general, and after many operations where there is much hemorrhage; only we must take care to remove it at the end of a few hours, otherwise the strong pressure would excite violent inflammation, and endanger gangrene.

All these means of suppressing bleeding, apply only to external hemorrhage. When the hemorrhage is internal, as in the chest or belly, if the vessel is large, the patient always dies; if the vessel is small, although it cannot be instantaneously stopped, it may be checked and ultimately suppressed by general bleeding, rest, coolness, avoiding every source of irritation, and keeping down the actions of the system by low diet, saline preparations, the tartrate of antimony, and all those medicines which repress vascular action.

1st,—INCISED WOUNDS.

Incised wounds are the most simple of all wounds, and the danger is less than in any species of wounds where the injury is of equal extent. They are more easily cured, and the constitutional symptoms which follow, less violent than any of the other species we have enumerated. When the wound is small, it is followed only by pain and slight local inflammation, but when it is extensive it is succeeded by a general febrile action, denominated symptomatic fever, the violence of which is generally regulated by the extent and situation of the wound, and state of the patient's constitution.

TREATMENT OF INCISED WOUNDS.

In the management of incised wounds, our first object is to suppress the hemorrhage, which is always more profuse than in any others. If the wound is superficial, this is readily effected by bathing it with cold water, and exposing it for some time to the air, or by using some of the weaker styptics; if the wound is deep, the hemorrhage will be more considerable, and in this case every artery which is seen throwing out its blood in jets, should be secured by ligature. If the hemorrhage is profuse, and the wound so small as not to expose the mouth of the bleeding vessel, we may employ compression, provided that the wounded parts lie so firmly against a bone as to render the compression efficacious. Compression within the wound should be resorted to only where the ligature cannot be employed, as it prevents us from bringing the opposite sides of the wound together, and endeavouring to heal it by the first intention. We suppress the bleeding then by styptics, the ligature, or compression according to the nature of the case, recollecting that the ligature where admissible, is the safest and most effectual means of suppressing hemorrhage.

After the bleeding is suppressed, our next object is to remove any foreign body which may be lodged in the wound, as pieces of glass, wood, or metallic instruments. If these are allowed to remain, they always excite so much irritation, as to be productive of that degree of inflammation which invariably terminates in suppuration.

Having effected these two primary objects, the stopping of the hemorrhage and the removal of extraneous bodies, our next business is to dress the wound; and here undoubtedly our aim should be to put its opposite sides in accurate contact, and endeavour to procure adhesion, or heal it by what is called the first intention. This can always be effected where there is no loss of substance by placing the parts in a proper position; but even where a loss of substance has taken place, it is important to bring the opposite sides of a wound as nearly in contact as possible, as it greatly accelerates the cure, excites less constitutional irritation, and makes a more seemly scar. When the lips of a wound have been brought into contact, we retain them, and endeavour to procure re-union, by placing the parts in a proper posture, by means of plasters, bandage, and suture.

Position.—A proper position is of great importance in the treatment of incised wounds. The wounded parts should always be placed in the posture best appropriated for bringing the edges together, and keeping them so during the cure. This is sometimes effected by relaxing the muscles, and sometimes by putting them on the stretch. In all wounds of the trunk, and in all transverse wounds of the extremities, it is by relaxing the muscles connected with the wound that the lips are brought most nearly into contact. In all longitudinal muscular wounds of the extremities, the same end is attained by putting the muscles on the stretch. Thus, in all deep transverse wounds on the fore part of the lower, and back part of the upper extremity, we extend the limb; in all longitudinal wounds of the same parts, we bend it. Again, in transverse wounds on the back part of the lower, and fore part of the upper extremity, we bend the limb, and in longitudinal wounds of the same parts we extend it.

Plasters.—Plasters are more adapted to superficial than to deep wounds, or where the parts are not much retracted, and where they lie firm against a bone as in the scalp. When the wound is quite superficial merely through the integuments, we use black court plaster; when a little deeper, adhesive straps; but when very deep, we have recourse to sutures; the sutures should always be supported by plaster, and also by bandage if admissible, otherwise they are apt to cut through the edges of the wound before it cicatrizes, more especially if the parts are much on the stretch; besides, the support given by the plasters and bandage, prevents the general tumefaction of the wound.

The Uniting Bandage.—The Uniting Bandage is particularly useful in supporting the edges of the wound, and taking off any undue strain from the sutures. It is formed by making a slit in the centre of a double-headed roller, and passing one of the heads through the slit by which it grasps the limb and supports the edges of the wound. This bandage should always be employed in longitudinal wounds of the thigh, leg, and arms, whether we use a suture or not, and is particularly useful when the wound is deep. Indeed in deep wounds it is impossible to keep the opposite surfaces fairly in contact without the uniting bandage. The application of this bandage is illustrated in Chap. VI.

Sutures.—Sutures are far less employed in the practice of the present day than they formerly were. They are not to be used indiscriminately; but there are many cases where they are singularly useful, and some in which they are indispensible. They are particularly useful in incised wounds, and after many operations in old age; as at this period of life there is little tendency to inflammation; therefore, so far from producing irritation and preventing adhesion, in these circumstances they promote the latter by exciting that necessary degree of inflammation which is requisite to effect this end. They are particularly useful in wounds of the scalp in old people, more especially where the lips of the wound cannot be kept in contact by means of adhesive plaster; for when the scalp shrinks, and the bone remains denuded, it is apt to inflame and exfoliate, or affect the brain; it is therefore an object always to keep the bone covered. And the use of sutures is indispensible in extensive wounds of the abdominal parietes, after the operation for hare-lip, and in wounds of the under lip; for whatever Mr Louis may have said to the contrary, there is not only great difficulty in keeping the parts together, but great danger in trusting to bandages to procure reunion.

Whenever we are able to keep the parts in accurate contact by means of plaster and bandage, we should without doubt prefer them to the suture, particularly in youth and in the meridian of life; but where this cannot be accomplished, as is sometimes the case, we must have recourse to the suture. The only two cases in which the use of the suture is interdicted, are those of robust middle age, where there is much tendency to inflammamation, and those in which inflammation actually exists; for no stitches should be passed through a wound in an inflamed state.

The sutures in common use are only two, the Interrupted and the Hare-lip or Twisted Suture.

The Interrupted Suture.—The Interrupted Suture is the one most commonly used. It is employed in wounds involving the skin and cellular substance, and in muscular wounds, except in those of the face, where we have recourse to the hare-lip suture. It may be formed either by one or two surgical needles armed with a ligature. When one needle is used, it is first carried through the skin on one side of the wound, then across the bottom of the wound, then out at the opposite side through the skin. When two needles are used, they are both entered from the inside of the wound, one being carried through one side, and the other through the opposite. The needles are now to be cut away; and if this suture has been used after a surgical operation where there is a great extent of wound, each ligature should be tied as soon as it is passed; but, if the wound be of small extent, all the ligatures should be passed before any of them is tied. They should all be tied with the surgeon's knot; that is, the end of the thread should be passed twice through the noose before it is drawn. Each needle should be passed at such a distance from the edge of the wound, as to prevent it cutting its way through, and it should be always carried down to the bottom of the wound. The rule is to keep as far distant from the edge as the wound is in depth, and to pass the ligatures about an inch distant from each other. In the interstices betwixt the ligatures, we should apply either strips of black court plaster, or adhesive straps, which not only keep the wound in more close contact, but help to take the strain off the suture, and, if requisite and applicable, support all by means of the uniting bandage. Fig. 1st in the Marginal Plate * represents the Interrupted Suture, used after the operation for the removal of the mamma.

THE HARE-LIP OR TWISTED SUTURE.—The Hare-lip Suture is used in accidental wounds of the lip, after the operation for hare-lip, and after the extirpation of cancers or tumors of the lip. It is also useful in wounds of the face, particularly the eye-lids. It is formed by passing the hare-lip pin through the lips of the wound, and then twisting round the pin a ligature repeatedly in the form of the figure 8. Fig. 2d in the Marginal Plate shews the manner in which this suture is formed; the ligature is twisted round the upper needle; its ends laid over the middle one, and the lower needle is left free. But the common

---

* *Vid.* next page.

Fig. 1.

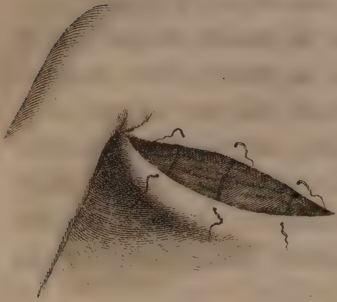


Fig. 2.

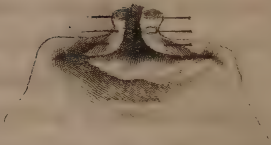
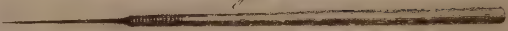


Fig. 3.



Engd by W. & D. Lizars Edinr

hare-lip pins are not easily passed; they are thick and clumsy; and after they are withdrawn, always leave large ulcerated points. The common sewing needle is a preferable instrument. It is preferable, because it is more easily passed than the common hare-lip pin, and because it leaves smaller ulcerated points, and consequently occasions less deformity. It is, therefore, the best instrument for uniting the wound after operations on the lip, and in deep wounds of the face and eye-lids. It may be passed like the common hare-lip pins by means of the Port-aiguille; but the preferable way is to mount them in sticks, as practised and recommended by Mr J. Bell; and after the needle is passed, and the ligature applied, the stick is cut away. See the Marginal Plate, fig. 3.

When this suture is employed, strips of black court plaster should be applied in the interstices betwixt the pins, and the pins should always be withdrawn early on the third or fourth day as soon as adhesion has taken place, otherwise they cause small ulcerations, which leave permanent marks.

When the sutures have been passed and the plasters applied, we lay on above all a pledget of some simple ointment, or a little dry lint, with a soft compress and appropriate bandage; the bleeding soon ceases; a thin serum like blood and water succeeds, which oozes through the lint, but gradually lessening, the lint becomes dry, and forms a hard cake, which also serves to keep the edges of the wound in apposition, On the third day, sooner or later, according to the state of the weather, we undo the dressings, removing those which adhere by bathing with warm water; the plasters are renewed, while the stitches are allowed to remain till the parts are united.

When we have had recourse to the suture to procure reunion, our chief care must be directed to regulate the inflammation in the wound. If the inflammation run high, there will not only be great pain, but it will terminate in suppuration; the excess of inflammation should therefore be repressed, by keeping the part constantly wet with cloths dipped in saturnine lotions; and if it still increases, the stitches should be immediately cut out, all undue pressure removed from the wound, and warm emollient poultices applied. When the inflammation has completely subsided, and suppuration is establised, the lips of the wound should be again approximated; but instead of recurring to the stitches, it will be preferable to attempt to keep them in contact by plasters and bandage.

2d,—PUNCTURED WOUNDS.

Punctured Wounds are those inflicted by the bayonet, small sword, pikes, and other sharp-pointed instruments. They are always more dangerous than simple incised wounds, and have occasionally been attended with very alarming symptoms, both constitutional and local. These dangers evidently arise from the inflammation of the wound, and have generally been ascribed to the partial division of the nerves. This doctrine appears to be erroneous. We daily see wounds inflicted by sharp instruments, where there must be a partial division of nerves, and yet none of those alarming symptoms follow which attend many punctured wounds. The structure of the parts shew that the danger arises from the inflammation of the fascia, and this inflammation is more apt to be induced when the wounding instrument rather tears than cuts; hence it more readily follows wounds inflicted by pikes, nails, or the spikes on the back of carriages, than by swords or bayonets. We perceive, that wherever the fascia is thick and strong, particularly where it firmly binds down the muscles, punctured wounds are apt to inflame, and to be followed by a train of bad symptoms, as in the head, flexure of the cubit, where we commonly perform the operation of blood-letting, the palm of the hand, and sole of the foot. This partly arises from the inflammation of the fascia itself, and partly from the inflammation of the muscles under the fascia, which are prevented from swelling by being bound down by this strong unyielding membrane. A prick in the point of the finger sometimes produces whitloe, or an inflammation of the tendinous sheaths of the flexor muscles of the fingers; the puncture in opening a vein at the bend of the arm is sometimes succeeded by great tension, violent pain, fever, contractions of the limb, and spasms of the whole body; and a punctured wound of the head, from the peculiarity of its integuments, is often followed by general inflammation of the scalp, vomiting, delirium, and nervous twitches. All these alarming symptoms, no doubt, arise from the inflammation and unyielding nature of the fascia, and not from the partial division of a nerve.

TREATMENT OF PUNCTURED WOUNDS.

Punctured Wounds must, in the first instance, be treated as simple incised wounds. If there is any hemorrhage, or if any foreign body is engaged in the wound, the former must be immediately suppressed in the manner already recommended, and the latter must be removed. A piece of adhesive plaster or a little lint is then to be applied with a compress and bandage, the part kept at rest, and the patient low and cool. Under this treatment, the wound frequently adheres. This is often the case when inflicted by the point of a sword or bayonet; but if the wound inflames and becomes painful on pressure, we should immediately apply a warm emollient poultice; the poultice should be laid on as warm as the patient can bear it, renewed every three or four hours, and the wound bathed with warm water, or fomented with an opiate or saturnine solution for half an hour three times a-day. The discharge is generally thin and ichorous, and there is danger of its extending under the fascia, and forming sinuses. To obviate this, as soon as matter is detected, it should be discharged by puncture or incision. If there is much symptomatic fever, and more especially if combined with affections of the nervous system, a free incision should be made into the wound. This should be done in a transverse direction, and carried to such a depth as to divide the inflamed fascia. This generally gives immediate relief, and is followed by a discharge of good pus from the wound, which before gave out a thin ichor. After this incision, the bad symptoms commonly subside; but should they recur, the incision must be repeated. The poultices must be continued till the inflammation abates, when we have recourse to simple dressings.

3d,—POISONED WOUNDS.

THE most dangerous kinds of wounds are those that are poisoned; because, independently of the local injury and its effects on the system, there is superadded a noxious principle, which, through the medium of the nerves or absorbents, or both, in the majority of cases, affects the whole body, and frequently soon induces death. It would appear that all poisons, whether animal, vegetable, or mineral, always act upon a peculiar structure or set of organs; and that the same structure is uniformly affected, whether the poison enters the system by external absorption, by inhalation into the lungs, or by the alimentary canal.

The poisoned wounds which chiefly engage our attention in this country, are those arising from the bites of rabid animals; but we also perceive that wounds inflicted by the stings of some insects in certain habits, excite such violent local symptoms, and are productive of so much constitutional irritation, that we rank them under this head. In the southern parts of Europe, the bite of the viper and the sting of the scorpion frequently produce alarming symptoms; but it is chiefly in the East Indies and in America where the large and poisonous serpents prevail; and among savage nations who poison their arrows and other missile weapons, that wounds of this description are followed by death.

The stings of gnats, bees, wasps, and some other insects, are sometimes soon followed by inflammation, attended by considerable pain and swelling. It is probable that these symptoms arise from the irritation produced by the sting and not from poison; they are rarely followed by any constitutional affection unless in very irritable habits, the injury is therefore generally local; but when constitutional symptoms supervene, they are not those arising from a poisoned state of the system, but symptomatic fever, the effect of irritation.

I have frequently seen the sting of the scorpion followed by violent inflammation and swellling, similar to those of bees and wasps, only in a more aggravated degree. In the years 1803 and 1804, I had many opportunities of witnessing wounds inflicted by the sting of the scorpion on board of La Dianne frigate. She was one of those French ships which escaped from the battle of the Nile, but was afterwards captured by the British when coming out of Toulon. In August 1803, she was commissioned at Plymouth, and taken into the service of the British navy. Having been long in the Mediterranean while in the French service, the scorpion had got on board. From the coldness of our climate the insect had lost its vigour, and lay concealed behind the lining, in the seams, betwixt the timbers, and in other parts of the ship; but no sooner had the ship gone to sea, and proceeded to the southward, than it was found that she was literally swarming; the heat renewed their activity, they crawled forth from their lurking-holes, and stung many of the men. The wound was always followed by violent and extensive inflammation, considerable swelling, and great pain; but I never observed any violent constitutional symptoms succeed to the local.

Fatal consequences often arise from the bites inflicted by various species of serpents. We have no opportunities of observing wounds of this description in this country, but they are common in the warmer climates. In the south of Europe, the bite of the common viper gives rise to a wound which is soon followed by great pain, swelling, and extensive inflammation, which has a tendency to terminate in gangrene; and unless the structure be removed by the knife, or destroyed by the actual or potential cautery, in ten or twelve hours there frequently succeeds vertigo and vomiting, attended with a feeble and unequal pulse, universal depression, faintness, and complete jaundice; an acute pain about the praecordia, and sometimes convulsions, which, however, rarely prove fatal.

In wounds arising from the bites of serpents, the constitutional succeed so rapidly to the local symptoms, as to make it appear that the system must be affected through the medium of the nerves, and not through the channel of the absorbents. Although, no doubt, in the bite of the viper, there is a sufficient length of time betwixt the infliction of the wound and the appearance of the constitutiunal symptoms to allow the poison to enter the system by absorption, still this is not the case with the bites of many other kinds of serpents. We know that the bite of the cobra de capello produces death in six or seven minutes; and it is reasonable to conclude, that all the poisons of the same class of animals must operate on the system in one way, more especially where the symptoms are the same, differing only in degree.

The most alarming envenomed wound which we meet with in Britain, is that which occurs in consequence of the bite of a rabid animal. It heals indeed, as readily as that arising from the bite of a sound animal; and it is worthy of remark, that the constitutional disease which is apt to follow, and which, from its most marked symptom is termed Hydrophobia, does not of necessity succeed to such a wound, any more than small-pox or venereal succeeds exposure to these infections. We frequently observe several persons bit by the same dog within a short time of each other; and although the wounds are apparently equally extensive, and nothing done for the removal of the disease, yet hydrophobia shall succeed in some cases, and not in others. This may arise from some of them being bit through the cloathes, by which the saliva will be wiped off; from a smaller quantity of saliva in the animal's mouth at one time than another; or from an erethismus in the lymphatics of the part by which the saliva is not absorbed.

From the great length of time in some cases before the constitutional disease appears, it is clearly by absorption that the system is affected. It sometimes takes place so early as the fifth or sixth day after the injury; in some cases it has occurred so late as eleven or twelve months, but the common period of its appearance is from the thirtieth to the fortieth day; generally the wound inflames and becomes painful before the appearance of the constitutional symptoms, but sometimes the disease takes place without any alteration in the site of the wound.

When the constitutional disease begins to manifest itself, before the wound heals, a remarkable change in the appearance of the sore generally takes place; instead of continuing to granulate and discharge good pus, it inflames, assumes a sloughing appearance, and the discharge becomes thin and ichorous.

Hydrophobia is always preceded by great depression of spirits, a general restlessness and unhappy state of mind; there is a gloom spread over the countenance, and an inclination to avoid society. It would appear that these primary symptoms do not arise from the alarm excited by the bite of an animal thought mad, but are inseparably connected with the disease, as they are also observed to occur in children who have been bit, but who are not aware of their danger. To these symptoms there succeed a loss of appetite, nausea, a quickness of pulse, a starting in sleep, great thirst, with an inability to swallow liquids; this inability not only gradually encreases, but every attempt is attended with inexpressible horror, and universal agitation: there is a perpetual ejection of viscid phlegm from the mouth, the eye now becomes prominent and wild, the countenance anxious, and respiration difficult. At a later period, the pulse becomes remarkably quick, there takes place great horror attended with startings, and sometimes general convulsions, more especially when liquids are presented, the surface of the body touched or exposed to a stream of cold air; the operations of the sensorium are at last so far deranged, that the patient becomes completely mad; he feels great alarm, and makes violent and repeated efforts, as if to escape from danger; which horrid state of suffering at length produces so much exhaustion, that he rapidly sinks and expires.

TREATMENT OF POISONED WOUNDS.

For the stings of gnats, bees, or wasps, the best local applications are rose-water, or solutions of the acetite of lead or opium; a bit of linen wet with one or other of these should be kept constantly applied to the part, or it may be from time to time bathed with laudanum or oil. Under this treatment the inflammation soon abates, and the pain and swelling gradually subside; if there is much fever, ten or twelve ounces of blood may be taken from the arm, and a saline cathartic exhibited, while we keep the patient cool and quiet: but there is very seldom any necessity for adopting such measures. The treatment we have now recommended for the stings of bees and wasps, will also be found to be the most successful for the sting of the scorpion.

But the best security against the bite of a poisonous or rabid animal, is to cut out the part, or, where this is inadmissible, to destroy the envenomed structure by caustic; in the wound inflicted by the bite of the viper, but more especially the cobra de capello and other of the more poisonous serpents, the symptoms, both local and constitutional, supervene so quickly, that the opportunity is generally lost before the surgeon is called. However, should he see the patient a short time after the accident, he ought immediately to remove the injured part by excision, if situated in muscular parts, inducing suppuration in the wound by means of the powder of cantharides, the red oxide of mercury, basilicon, and poultices. If the knife cannot be freely used, caustic should be applied: the best preparations are the argentum nitratum, caustic potash, or the oxymuriate of antimony; previous to its application the bleeding should be stopt by bathing with vinegar and water, or with a solution of alum or other styptic. In a few hours the caustic destroys the envenomed structure, and we promote the separation of the eschar by poultices and warm fomentations.

When the wound is inflamed and the poison has begun to operate before the surgeon is called, it has been recommended to apply oil to the wound and neighbouring parts; but the chief dependance has been placed upon ammonia: the aqua ammoniæ should be used both externally and internally, and, if at all useful, should surely be taken in much larger doses than is generally advised; independently of dropping it upon the wound, ten or fifteen drops should be taken internally in a glass of water every hour, till the bad symptoms abate, when the dose may be gradually diminished. The eau de luce, which is just the succinated spirit of ammonia, or a combination of the aqua ammoniæ with oleum succini, has been much recommended for the bite of the viper by the French writers.

When a person presents himself bit by a dog, if the animal has bit others, if he has made his escape so that his state cannot be ascertained, or if he is decidedly mad, it will be prudent to remove the parts immediately by the knife; where this cannot be accomplished, we must have recourse to caustic, but the knife is always the preferable mode of procedure, if practicable. After the bit parts have been removed, we induce suppuration as recommended after the removal of the parts bit by the viper. The earlier after the accident that the operation can be performed the better; but as the time that elapses betwixt the receipt of the bite and the affection of the system by hydrophobia is indeterminate, a considerable time frequently intervening before the constitutional symptoms appear, and as they are generally preceded by pain and inflammation of the wound, where these have not occurred, at whatever period of time, the operation should still be performed, to avert, if possible, so great a calamity as the occurrence of this dreadful disease; for when it does occur it may be deemed incurable. Mercury, volatile alkali, camphor, musk, opium, and other antispasmodics have all been found of no avail; and although, from the result of two cases treated in the East Indies by Dr Shoolbred, copious bleeding did appear to prove a cure for the disease, subsequent experience has shewn, that this treatment is not to be relied on.

4th,—LACERATED AND CONTUSED WOUNDS.

Wounds inflicted by blunt bodies are always attended with a considerable degree of contusion. The parts are not cleanly divided as in incised wounds, but rather torn; therefore the edges of such wounds are always ragged and irregular. From the contusion there is little or no bleeding, even when large vessels are torn: hence, to the ignorant spectators, they do not excite that alarm which is apt to be produced by the appearance of incised wounds; but they are much more dangerous, and the danger is always in proportion to their extent, and to the parts injured. In an incised wound even of considerable extent, the vitality of the parts is perfect, so that when the bleeding is stopped, and the edges of the wound put in contact, they will most commonly adhere; whereas, in lacerated and contused wounds, the structure is frequently so destroyed by the blow, that they either inflame and suppurate, or fall into gangrene. There are three states under which wounds of this description present themselves: the wound may be entirely formed by laceration, and attended with little contusion; there may be considerable contusion, but still not to such a degree as to destroy the vitality of the part; or the contusion may be so great as entirely to destroy the structure. In the first case, if the lips of the wound are put in contact, they will adhere like a simple incised wound, because there follows no more inflammation than what is requisite for adhesion; in the second case, the parts will not adhere but inflame and suppurate; and in the third case, they will fall into gangrene, and slough.

It frequently happens from violent blows with a blunt body, that extensive and even fatal internal wounds are inflicted, without any lesion of the skin. This is the most dangerous species of contused wounds, and is exemplified in blows with sticks, large stones, spent cannon-balls, the kick of a horse, or even the fist; the skin yields and is not cut or torn, but the parts give way or burst beneath. All the textures of the body may suffer from contusion without any external wound, and the injury may be more extensive than what is at first apparent; the bones may inflame and die, the joints may inflame and suppurate; and the viscera and internal blood-vessels may be burst. When the injury is not very great, the smaller blood-vessels are burst, and the blood is poured out into the cellular substance, forming ecchymosis; the contused part swells, and becomes of a dark purple; it gradually acquires a lighter shade, turns yellow, the extravasation seems more diffused, and at length disappears, leaving the structure entire, and all the functions of the part complete.

If a severe blow be inflicted upon the head, an internal blood-vessel may be burst, giving rise to compression, unattended with concussion or depressed fracture; or the bone may be so injured as to inflame and die, producing secondary affections of the brain: if a similar blow be inflicted on the abdomen, the intestine, liver, spleen, or a great blood-vessel may be burst. In such blows the liver is particularly liable to be torn, and from such an accident I have known a man die in ten or twelve minutes, possessing all his faculties, and complaining of pain by no means commensurate with the injury.

Lacerated and contused wounds are accompanied with little pain, and we have remarked that they are also attended with little bleeding even when large vessels are wounded. The memoirs of the Royal Academy of Surgery, and the Philosophical Transactions, present us with cases where the arm and the leg have been torn from the body by machinery, without any remarkable bleeding. I have seen the feet torn off at the ancle, the legs and part of the thighs largely stripped of the skin, cellular substance and muscles, yet no bleeding. I have also known the axillary artery and vein torn across, and the arm nearly separated from the body by a mill, without any hemorrhage from these vessels.

On Thursday the 13th of April 1809, about 10 o'Clock in the morning, while Thomas Bell, thirty-five years of age, by trade a miller, was following his usual occupation of attending the mill, he observed that one of the ropes, by which they hoist up the bags of grain, had slipped off the pully, he stretched forth his right hand to replace it in its sheath, while he thoughtlessly leant with the elbow of his left arm on a moving shaft of a windlass, but, as he imagined, sufficiently distant from the tackle to suffer any harm; however, the rope connected with the windlass, caught hold of him above the elbow, dragged in his arm, and nearly tore it from the body; he was at the same moment hoisted up to the roof, his head was dashed against a beam, and his side violently crushed on the shaft of the windlass; no sooner was his arm engaged in the machinery, than the resistance which it gave, broke an iron spindle of three inches diameter, upon which the great wheel moved; this instantly stopped the mill, otherwise the arm would have been entirely separated, and he would have fallen to the ground. His comrades immediately removed him to his own house, which was adjoining, and in a short time after, I saw him, along with Mr J. Bell; we found him a most miserable spectacle, we cut up his jacket, and found the humerus fractured four inches above the elbow; the whole shoulder stript of its skin and cellular substance, the axilla laid open, the nerves bare, the artery and vein torn across, the whole muscles riven from their insertions, and nothing connecting the arm to the trunk but the serratus major anticus muscle, and skin on the back part, for the clavicle was forced from the acromion process: still there was no bleeding either from the artery or vein, the only blood which he lost, which might be about a pound, had come from the smaller vessels surrounding the shoulder. The ulnar and radial nerves were lying like broken strings of a bow; the ulnar nerve seemed to be torn across where it passes over the elbow, and was lying very loose; the motions of the heart and lungs were perceived very distinctly through his side; his extremities were cold, his pulse not perceptible at the wrist, his countenance pale and sunk, he seemed near dissolution, and he entreated us for "God's sake not to touch him, but to let him die". He had fifty drops of laudanum in some warm wine, hot bricks and bottles of warm water were applied to his feet; the arm with the scapula was removed, which was done by dividing the insertion of the serratus major anticus, and skin on the posterior part; the flaps of skin were brought together, and retained by two stitches of the interrupted suture, compresses of soft lint were applied to the shoulder, and two pupils left to watch him.

Upon visiting him at 4 o'Clock, P. M. six hours after the accident, I perceived an emphysematous tumor, larger than a child's head, principally situated over the sixth, seventh, and eighth ribs, several of which were evidently fractured. The emphysema extended towards the scrobiculus cordis, where there was much oppression, and towards the sternum, but it did not reach the neck or face, or pass down the abdomen; his breathing was difficult, his extremities did not feel cold, his pulse was perceptible at the wrist, but feeble and fluttering; upon the whole he was composed, and felt tolerably easy. He passed a tolerable night after taking forty drops of laudanum; in the course of Friday, the second day after the accident, the difficulty of breathing considerably encreased, but the emphysema diminished; he was much annoyed with cough and frothy mucus, rattling in his trachea, but brought up no blood; complained greatly of his side, but felt no pain in his shoulder; he was unable to bear any tight bandage round the thorax; he therefore had a large adhesive plaster applied over the pained part to give support when he coughed; pulse 126; in the course of Saturday, the third day, the cough became easier, the emphysema considerably diminished, but the difficulty of breathing was much encreased; pulse 120, and by no means feeble.

On visiting him on Sunday morning, the fourth day, I found that he had passed an uneasy night, not from pain, but from difficult respiration, which had now become so laborious, that the thorax and abdominal muscles were in violent action; he answered every question distinctly, and his ideas were quite collected which had been the case all along; pulse 126, and rather feeble. The discharge from the shoulder was rather profuse, I therefore raised him up in bed, removed the wet dressings, and applied some clean lint; when doing this I observed a large wound in the scalp, nearly of the size and shape of a horse-shoe, situated over the occipital, the right parietal and temporal bones; it was in a state of suppuration, the flap did not adhere, but slipped easily backwards; I therefore brought the parts together, and retained them by means of plaster and a stitch at the angle. In the course of this day the breathing gradually became more and more oppressed, he sunk every hour, and expired at 4 o'Clock, P. M. the fourth day from the accident.

Upon opening the cavity of the thorax, there were found in the left side about two pounds of a bloody water, surrounding the heart and lungs; five or six of the ribs on that side were completely stove in; and the fractured points had so lacerated the lungs that they could not be inflated; the subclavian artery was torn across about an inch and a-half from the place where it comes off from the arch of the aorta. It was not a separation of the rings of the artery, but its extremity was ragged like a fringe, and it was plugged up with a clot of blood.

Had there been no injury done to the thorax, I am convinced the man would have lived; although the immediate shock (from the accident) given to the system was great, still from this he seemed to recover. There was no bleeding from the wound for the four days which he lived; and it was so nearly covered by flaps of the skin, that it would soon have healed.

TREATMENT OF LACERATED AND CONTUSED WOUNDS.

Although it be the character of lacerated and contused wounds not to heal without the formation of matter, still if there is little contusion, and the wound be formed almost entirely by laceration, we should make the attempt to heal it by the first intention, and we shall frequently succeed. In such a case, we use no sutures, because by increasing the attendant inflammation, which, in wounds of this nature is generally considerable, they would defeat our purpose by inducing suppuration; but we bring the edges of the wound together, apply strips of adhesive plaster, lint, compress, and bandage. If the inflammation rises high, attended by much pain, we at once remove the plasters, take off all pressure from the wound, and apply a large warm poultice, which we repeat every three or four hours till suppuration is fully established, when we again make an attempt to bring the edges as near together as possible, which greatly shortens the period of cure. When the contusion is considerable, we can have little hope of procuring immediate reunion; in such a case it is needless to make the attempt. We cover the wound with soft lint; and if there is no bleeding, immediately apply a large warm poultice. Where there is much bleeding, we apply the lint, and wait a few hours till the bleeding ceases, before we lay on the poultice.

Lacerated and contused wounds in the vigour of life, are frequently attended with high local inflammation, and give rise to violent symptomatic fever. In such cases, it will be prudent to bleed the patient according to circumstances, but no blood should be taken away, more especially where the wound is extensive, till such time as the patient has completely recovered from the first shock, and the pulse has begun to rise.—This period must be watched for. Conjoined with bleeding, we have recourse to saline cathartics and low diet. In simple contusion without a wound, and attended by ecchymosis, our object should be to promote the absorption of the extravasated blood; and this we do by applying to the part stimulating embrocations, such as soap liniment, camphorated spirit of wine, and diluted acetate of ammonia. The part should be gently rubbed with one or other of these twice or thrice a-day, and in the intervals a piece of lint or fine linen wet with the same should be kept constantly applied. In no instance should we make an opening to discharge the ecchymosed blood, till we find that it cannot be absorbed. If the extravasation is not extensive, we shall, by pursuing this practice, generally be able to promote its absorption, unless when situated under the periosteum. Tumors of the scalp, formed by ecchymosed blood when situated in the cellular substance, are speedily absorbed, especially in early life ; but when placed under the periosteum, although small, we find this so difficult, that we are frequently forced to open them to discharge the blood.

When an extremity has been dreadfully crushed by a piece of machinery, cruelly lacerated, or partially torn off, the shock given to the system is so great, that the vital powers are nearly extinguished, the surface of the body is pale, the extremities cold, the countenance wan, the eye sunk, the lips livid, the pulse not perceptible at the wrist, and the wound generally without bleeding and dry. If the injury is not so great as to extinguish life, the patient, in a longer or shorter time, so far recovers, as to answer questions distinctly ; his extremities and skin regain their natural warmth, the pulse at the wrist is felt feeble and fluttering, the features become more full and florid, the lips acquire their former hue, there is a slight pain in the wound, and it begins to bleed or emit a bloody serum. In a few hours more, the face becomes somewhat flushed, the pulse rises, the surface of the body feels hot ; there is a slight headach, and considerable pain in the wound. The actions of the system continuing to rise, local inflammation succeeds, accompanied by high inflammatory fever.

If the injury is a fit case for amputation, it is universally admitted, that if we perform an operation when the inflammation and fever have commenced, the patient will die. It is therefore generally recommended to be done shortly after the accident; but here it is necessary to draw a line of distinction to caution the young surgeon against proceeding to immediate amputation, and to point out to him the exact period at which it can be performed with safety. I have seen many patients die from the operation having been too early performed. It is here precisely the same as with gunshot-wounds, no amputation should be performed before the actions of the system have begun to rise, and the patient completely recovered from the first shock. The operation should not be performed before the extremities and surface of the body become warm, the features full, the pulse distinctly felt at the wrist, and the patient complains of pain in the wound, attended with slight bleeding or oozing of bloody serum. In some this will happen in a few hours, in others it will require 10, 12, 16, or 20 hours.

If we amputate at this period, our patient has some chance of recovering; if we amputate before, he will die a few hours after the operation, and be as surely lost as if we had amputated after the commencement of the febrile action.

5th,—GUNSHOT WOUNDS.

THE erroneous notions which prevailed among the ancients concerning the nature of gunshot wounds, led to a cruel and reprehensible practice; but by observation and reflection, this department has been much improved, and is now so simplified as to be reduced to the common principles of surgery.

It is now universally admitted, that every gunshot wound is a lacerated and contused wound, which must heal by suppuration and granulation; and the nature of the wound is nearly the same, whether inflicted by gunshot or by a club, bludgeon, or other blunt body, only more violent in degree: hence the characteristic of gunshot wounds is, that there is great contusion in the surrounding parts, attended with a deadness or want of sensibility; the edges of the wound are of a livid colour; there is little bleeding or pain; the parts, from a want of vital action, have a tendency to fall into gangrene, and are long in healing. The whole tract of the ball is a tube, the inner surface of which is bruised or deadened from the contusion, and in a few days sloughs off. When the slough separates, hemorrhage is apt to follow; hence every gunshot wound should be watched with much attention, more especially if in the course of a great artery. The most common time of sloughing is from the 6th till the 10th day; and during this period, the discharge is the same as from a gangrened part, of a dark bloody colour, and rather of a thin consistence, like the grounds of a beer cask.

There are five states under which contused wounds, received in battle, present themselves. 1st, Where a large ball strikes obliquely, contuses, fractures the bones, and sometimes entirely destroys the structure of the part, or causes extravasation of the blood into some of the great cavities.—Here, there is no external wound. 2dly, Where a large ball strikes so fairly as to carry off a limb. 3dly, Where a musket-ball enters, and remains lodged, a case in which there is in general only one opening. 4thly, Where a musket-ball passes quite through; here there are two openings, the wound at which the ball enters is always smaller and more contused than that at which it makes its exit. And, 5thly, Splintered wounds: these occur frequently on shipboard, often produce great laceration and contusion, with a destruction of structure so considerable as to require a great length of time to repair the breach and accomplish a cure.

Patients frequently recover after gunshot wounds, which at first sight are apparently very desperate. This arises from the ball not having exactly pursued that rout which its entrance and exit would appear to indicate. It frequently happens, that a musket-ball enters the anterior part of the abdomen or thorax, and passes out behind, leading us at first sight to imagine that it has passed directly across the cavity, whereas it has never perforated, but merely run round the convex surface of these cavities. The least obstruction will change the course, and give a new direction to a ball. Musket-balls have perforated the forehead, have run up betwixt the integuments and bone, and been found lodged under the skin on the occiput. They have also been found to pursue a long tract under the skin without entering any of the great cavities, and have been cut out far from their entrance. Nay, musket-balls have even entered the thorax and abdomen, run along their concave surface, betwixt their walls and the contained viscera, and come out behind, without perforating any of their contents.* This circumstance of balls deviating from their apparent course is very apt to mislead the young surgeon, and has frequently given rise to the report of wonderful cures being accomplished without one bad symptom, where the patient had been shot through the body. When a musket-ball takes a superficial rout, and does not perforate deep, its tract is generally denoted by a reddish streak under the skin.

---

* For wonderful examples of balls deviating from a right line, and pursuing a circuitous rout, see a paper of Le Vacher's in the Memoires de l'Academie Royal de Chirurgie, Tom. XI. 12mo edition; and Hennen's Observations on Military Surgery, a work replete with sound maxims, and abounding with valuable practical observations.

TREATMENT OF GUNSHOT WOUNDS.

Before the time of Parè, every wound inflicted by gunshot was considered as a poisoned wound, and hot turpentines, boiling oils, and spirituous tinctures were constantly applied, but never failed to produce violent pain, swelling, inflammation and fever, which aggravated every existing danger. Parè was the first who laid aside these cruel practices; he used simple dressings, and he was followed chiefly by our great surgeon Wiseman, who practised during the civil wars, and who treated every gunshot wound as a contused wound.

To these hot dressings succeeded the use of tents and setons; they were employed with the view to introduce medicines into the wound, to accelerate the separation of the slough, and to promote the exit of extraneous bodies; but there is no necessity for the introduction of any medicines, and the slough separates as soon as suppuration is established by means of our warm emollient poultices. Tents and setons act as extraneous bodies, they excite great irritation, keep up inflammation, and increase the discharge.

The old French surgeons were particularly partial to the use of tents and setons, but they are now seldom or never employed, especially the tent. Septalius and Magatus were the first who condemned the use of tents; and Belloste, who was chief surgeon to the French king's army in Italy, about 130 years ago, both by his practice and his writings greatly contributed to the exploding of them. If ever an English surgeon thinks of using a seton, it is in the after stage of the cure, when the wound has became fistulous, to assist in removing detached pieces of bone in gunshot fracture, or with the hopes of engaging a piece of cloth, or any other foreign body which he suspects to be lodged in the wound, and to be the cause of exciting inflammation and keeping up the discharge*.

The older surgeons, at the same time that they used tents and setons, were in the practice of dilating and scarifying gunshot wounds. All the French surgeons dilated them, and the practice had become universal among the British. Mr Hunter was the first who protested against these dilatations, and to him are we principally indebted for the discontinuance of them in the British service. The French surgeons have long been in the habit of dilating every gunshot wound; Desault constantly employed dilatation; Sabbatier, Richerand, Boyer, and the other French surgical writers of the present day, recommend the practice, and we find their great military surgeon Larrey dilating gunshot wounds. They say that incisions change the nature of the wound by converting it into a bleeding wound; that they allow of the free exit of extravasated blood and foreign bodies; that they accelerate the separation of the slough, and that they prevent excessive inflammation and take off the tension which is apt to follow where the muscles are bound down by a strong fascia; but I must confess that I see little necessity for the practice. It may be proper to have recourse to dilatation to enable us to extract nails, angular pieces of iron, and other sharp bodies, where the wound has been inflicted by these, as they always excite great pain, swelling, and violent inflammation, which terminates in abscess; and dilatation is always proper in the case of fractured and shattered bones, as it allows the fragments to be discharged, which otherwise would produce either sinuses or necrosis; but in common flesh wounds the practice should be abandoned. The British military surgeons in these cases do not dilate; in so doing, there is frequently danger of inducing hemorrhage. I have seen many recover speedily from gunshot wounds without one bad symptom, where no dilatation was employed. I should hardly dilate to extract a ball, and certainly never in any common flesh wound. If the ball has passed nearly through, and we can feel it under the skin, we should remove it by cutting directly upon it, and making what is called a counter opening; or if it can be discovered in the wound, it will no doubt be better to extract it than allow it to remain. But we should not tease our patient by much scarching: 1st, because musket-balls have lain in the fleshy parts without inconvenience for years, and even for life, the wound healing over them: and 2dly, because when the suppuration is established, the wound becomes larger, the ball becomes loose, and then can be easily removed; whereas, an angular piece of iron excites great irritation and pain, swelling, inflammation and abscess, protracting the cure.

---

* Although the use of the seton or a strip of linen in common flesh gunshot wounds be condemned by Richerand and Boyer, it was constantly recommended by Sabbatier, perpetually had recourse to by Dessault, and is now used by the majority of French military surgeons.

In the naval action fought in 1797, off Camperdown, the Dutch fired bags of nails, and pieces of old iron, which wrought great destruction. Wounds of this kind are very apt to occur in naval engagements, and may require dilatation to allow of the extraction of such bodies; but I should never think of dilatation in common flesh wounds inflicted by a musket-ball. In short, wherever I employed dilatation, it should be upon the common principles of surgery to extract a foreign body, likely to produce irritation, to pick away pieces of bone, or to tie a bleeding artery; but never solely from its being a gunshot wound.

A gunshot wound will, like every other, require a treatment adapted to its situation, whether it exists in any of the great cavities or in the extremities; but we should keep in view these general principles, first to attend to any bleeding, or to take efficient measures to prevent the possibility of a fatal hemorrhage, when the tract of the wound indicates that a musket-ball has passed across the course of a great artery; secondly, to extract any foreign body which may be in the wound, and which can be readily reached: in attempting to accomplish this, the finger is preferable to any instrument for searching, and the common forceps is the best instrument for extracting; and thirdly, to dress in the most superficial manner. No gunshot wound should be stuffed with lint: we clap a small bit of charpee on each of the orifices, and in a few hours after, when any bleeding which may have existed has subsided, we apply a large warm poultice. We promote the separation of the slough, by a continuance of the poultices and warm fomentations; when the slough separates and the suppuration is established, we lay aside the poultice and fomentation, dress superficially, and in general the wound soon heals. If it inflames, becomes painful, and the discharge grows thin and encreases in quantity, attended with an accession of fever, as it most likely arises from a piece of the clothes or other extraneous substance being engaged in the wound, we attempt to wash it out by injections, lay hold of it with the probe or forceps, or perhaps the matter brings it to the mouth of the wound, and as soon as it is expelled, the discharge acquires a good consistence, gradually lessens, and the wound soon heals up. While we adopt these local measures, we enjoin the antiphlogistic remedies and regimen; and if the wound inflames, and the pulse begins to rise, we more especially bleed, and if necessary repeat it, according to the age of the patient and the exigencies of the case; here there is nothing different from the common principles of surgery.

TRAUMATIC TETANUS.

THE nerves, like the bones, muscles, blood vessels, and other textures of the body, are liable to inflammation, and this inflammation is always followed by partial or general convulsions: hence we see, that when a nerve inflames in consequence of being punctured by the lancet in bleeding, from being torn or otherwise injured in a punctured, lacerated, or gunshot wound, or from being tightly embraced in a ligature, there follows a general state of spasm more or less violent.

When the spasmodic contractions are confined to the muscles of the jaws and throat, the disease is termed Trismus or Locked-jaw; when they extend to the whole muscular system, it is called Tetanus. Both forms of the disease may exist independently of each other, but they most commonly present themselves in combination. Locked-jaw and tetanus, which frequently occur in consequence of wounds, are the most formidable enemies we have to encounter, because the disease generally proves fatal. Although many patients have recovered from trismus and tetanus, yet so uncertain is our treatment of these diseases, that we subscribe to the aphorism of Hippocrates, which declares convulsions following a wound to be mortal, "Convulsio quæ vulnus incidit lethalis."

In warm climates, tetanus is frequently idiopathic arising from cold, such as from sleeping upon damp grass in the evening of a warm summer day; in cold climates again it is most commonly symptomatic, arising from lacerated and contused wounds, punctured wounds, and wounds inflicted by gunshot. It has frequently arisen from a nail running into the sole of the foot, or from a finger or toe being torn by machinery, jammed by a water cask, or otherwise lacerated and contused; sometimes it takes place from the nerve being included in the ligature along with the artery. I have often seen this from taking up the nerve along with the spermatic artery, after the extirpation of the testicle. I have also known the patient seized with tetanus and die of the disease, from an attempt to remove tumors from the axilla and groin, by embracing them with a ligature: and I have frequently known it to follow splintered wounds on board of ship.

It is worthy of remark, that tetanus does not appear till the nerve inflames: hence, it never occurs immediately after the wound, however lacerated the nerves may be, but generally at some distance of time, most commonly from the 4th till the 20th day. If we search the records of surgery, we shall find it occurring ten days, a fortnight, three weeks, and even a month after the accident, and sometimes after the wound has cicatrized. In ten cases which I had under my care at one time, following gunshot and splinter wounds, the tetanic symptoms did not appear till they had sloughed and lost every character of gunshot wounds, sixteen, eighteen, twenty days, and sometimes longer, after the infliction of the wound.

Trismus and tetanus are generally preceded, though not always, by pain in the wound, which commonly inflames, the discharge becomes less, and if the aponeurotic expansions or fascial sheaths are involved, it acquires a gleety appearance, there is a tenderness in the adjoining parts, and pain on pressure, more especially in the course of the nerves. The patient now complains of a stiffness in his neck, so that he is unable to turn his head round; he next feels a stiffness about the angles of the lower jaw, he is unable to open his mouth to any extent, and this rigidity of the muscles of the neck and jaw becomes worse towards night, so that he generally ascribes the beginning of his complaints to cold. The mastoid, masseter and temporal muscles, become rigid and feel hard; the rigidity extends along the back to the loins; his body is now occasionally convulsed, and generally bent strongly backwards, which is called opisthotonos, and which is the most common form of the disease. He is at this time unable to move, and when he attempts to do so, he immediately becomes convulsed and screams with agony; his arms begin now to be affected, they become stiff, and he is unable to raise his hand to his head; he is seized with an acute pain under the lower part of the sternum, by which his breathing is greatly impeded, and he feels as if he were laced down to the bed. This pain occasionally darts with encreased violence in the course of the diaphragm across to the back, marking a spasmodic action of that muscle; the abdominal muscles feel as hard as a board, and are strongly retracted towards the spine. There follow a stiffness of the lower extremities, a stretching out of the feet, and a rigidity of every muscle in his body. The jaw is generally now completely locked, and he swallows with so much difficulty, that when he sucks any liquid through his teeth, instead of passing into the œsophagus, it enters the trachea, and is ready to suffocate him. The angles of the mouth are retracted, and the teeth uncovered. constituting the spasmus cynicus, and the articulation is indistinct; the urine is generally passed with difficulty, high coloured and in small quantity; the bowels are obstinately costive, the fœces hard in round balls, sometimes white, sometimes streaked with dark brown, and exactly resembling coblers wax.

In the beginning of the disease, the pulse is but little affected. In its progress it becomes small, and towards the termination quick and irregular; when the nurses and other attendants attempt to raise the patient from the bed, he feels as heavy as a dead body; and upon the least motion, the spasms are violently reproduced. A profuse sweat frequently breaks forth in large drops over the whole body; the countenance is pale and sunk; the patient looks as if he were wasted by hectic, or some lingering disease; his pulse becomes gradually weaker, and he generally expires in a convulsion; the operations of the sensorium remaining unimpaired throughout the whole course of the disease.

TREATMENT OF TETANUS.

In the cure of Traumatic Tetanus, it appears to me that the application of remedies has been chiefly directed to the general system, and that too little attention has been paid to the state of the wound. If it be true that the nerve is generally, if not always, in an inflamed state, which is proved by dissection, it is evident that our first attention should be to subdue the inflammation in the injured nerve. This is best accomplished by removing every source of irritation from the wound, such as ligatures and other foreign bodies; by the repeated use of saturnine and opiate fomentations, with large warm poultices. If the practitioner has been in attendance from the beginning, and observes the commencement of tetanus, he should immediately make a transverse incision in the upper part of the wound, so as to divide the injured nerves and cut off the communication. If this is done on the first approach of the disease, it will frequently arrest its progres; but if it has existed even for a short time, it will be of no avail. It is upon this principle of cutting off the communication, and removing the injured and inflamed portion of the nerve, that amputation has been recommended. If resorted to very early in the disease, it will sometimes prove successful; but when tetanus is once fairly and strongly marked, I have had many proofs of its inefficacy. In several cases, where the wounded member has been amputated, the disease has not been even checked in its progress, but run on to a fatal termination. Larrey has found the actual cautery, when applied early to the wound, cure the disease. This it does by destroying the inflamed nerve; and upon the same principle Poterius cured Tic Doloreux by the hot iron.

While we apply our poultices and warm fomentations to the wound, or attempt to destroy the injured portion of nerve by the actual cautery, or cut off the communication by incision, we should at the same time have recourse to general remedies, and of these opium is the medicine which we have chiefly to depend on; it ought to be exhibited at short intervals, and in large doses; the dose should be given according to the effects it produces, and at no greater distance of time than two hours, or three at farthest, that the system may be kept perpetually under its influence. It is very remarkable that large doses of opium exhibited in this disease produce little or no effect upon the sensorium; they only lessen the pain and relax the spasms. We begin with a small dose, but gradually increase the quantity till it exerts some influence upon the disease. I have given, with the happiest effect, 200 drops of liquid laudanum for a doze to a patient who was unaccustomed to the use of the medicine; and in a case, which fell under the care of Dr Mackie of Southampton,* the patient, who was only fifteen years of age, latterly took, in divided doses, no less than two ounces and a-half of laudanum in the space of 24 hours, although he began only with doses of 15 drops every three hours. The Doctor states, "that this patient, used to no strong liquors, took, while at the worst, within 48 hours, five ounces of tincture of opium, prepared according to the London Dispensatory, which, so far from producing any injurious effect, as might have been feared, procured a very sensible alleviation of all the symptoms. In the space of five weeks, the time the disease lasted, he took in all twenty-four ounces and a-half of the same tincture, and nearly three drachms of solid opium; yet the head was so far from being affected by it, as might have been expected, that he had little or no delirium, but on the night when the dose was diminished."

---

* *Vid.* Medical Commentaries, Vol. XX.

In another case, under the management of Mr Harkness of Ratcliffe,* the patient, " from the 25th of February to the 18th of March, took, upon an average daily, one ounce of tincture of opium given in divided doses, and that without any effect upon the sensorium or the production of pain of the head, acceleration of pulse, or disposition to sleep. The quantity taken in the day was sometimes as much as one ounce and a-half, and sometimes as little as five drachms; but in sixteen of the twenty-three days here mentioned, he took precisely an ounce per diem." Along with this large quantity of laudanum, the patient also took upon an average daily two bottles of wine and six pints of porter. To keep up the action of the bowels, large doses of drastic cathartics were exhibited, sometimes to the extent of forty grains of calomel, forty-eight of the extract of colocynth, and forty of gamboge daily. In this extraordinary case, which lasted from the 26th of February till the 24th of March, a period of twenty-six days, the patient took in all twenty-five ounces and a-half of laudanum, one ounce five grains of calomel, one ounce five drachms and a-half of jalap, two ounces six drachms two scruples and nine grains of extract of colocynth, one ounce five drachms two scruples and five grains of gamboge, fifteen grains of scammony, fifty-six bottles of wine, and one hundred and ninety-one pints of porter, with the most marked salutary effect. I never saw any bad consequences occur from the use of opium in tetanus, but I think I have seen many patients lost from a timidity in exhibiting it.

---

* *Vid.* Medico-Chirurgical Transactions, Vol. II.

Blisters, musk, camphor, the warm and the cold bath, have been much recommended in this disease. The three former I believe to be of little or no use. I think I have frequently seen good effects from the warm bath. The cold bath was first recommended by Hippocrates, and has in modern times been used chiefly by Drs Wright and Currie. It has, however, proved of more service in idiopathic than in traumatic tetanus, the former of which is always more easily cured than the latter; but I cannot speak of it from experience, as I have never employed it, nor seen it used.

The medicine in which I place the chief confidence is opium; and the auxiliaries I employ are ether, alkohol, the warm bath, and strong cathartics. If these medicines are early and perseveringly used, they will frequently prove successful. We may begin with fifteen or twenty drops of laudanum every two hours, or three at farthest, gradually increasing the dose. It should be given in diluted alkohol or brandy, and in the intervals betwixt the doses, from one to two drachms of ether may be exhibited: while we use these medicines internally, the rigid muscles should be rubbed every four hours with laudanum and ether, and the patient be immersed for 12 or 15 minutes in the warm bath thrice in 24 hours. To counteract the tendency to costiveness which prevails in this disease, and to keep the bowels open when under the influence of so much opium, we must have recourse to large doses of active cathartics, of which the most certain in their operation are gamboge and calomel. The action of these may be greatly assisted by strong decoctions of senna used by way of enema, but the most valuable injection is the tobacco glyster. It is not only the most powerful remedy with which I am acquainted for exciting the action of the bowels, and bringing away the hardened fæces, but it also has a manifest effect in relaxing the spasms by the sickness and syncope which follow its operation.

I have frequently seen patients recover under the use of opium, and I have seen many patients die, but I am now convinced that in many of these cases the opium was too sparingly used. I have had two patients who recovered under the use of mercury, and there are several similar cases on record; but although mercury has in some cases proved efficacious, it is in general so long before it affects the system, that I should conceive it dangerous to trust to it, and should rather adhere to the practice now recommended.

In tetanus, the muscles of the pharynx are affected in a similar way with those of the other parts of the body; hence we find, that when any liquid is poured into the mouth, instead of passing into the œsophagus it frequently enters the trachea, and endangers suffocation. If any attempt be made to pass an eel's skin or hollow bougie, the spasms will be instantly reproduced; and we frequently observe this to be the case when the patient attempts to swallow, more especially liquids; when the power of swallowing is therefore lost, we must use the medicines by way of clyster, by friction, or by both.

SECTION II.

OF PARTICULAR WOUNDS.

Although the doctrines we have laid down respecting the general treatment of wounds be applicable to every texture of the body, still there is a manifest distinction in their nature and cure, arising from the structure of the parts which are involved. Thus wounds of the great cavities, from their being full of the vital organs, and from their susceptibility of inflammation, are particularly dangerous, and require a peculiarity of treatment. It is therefore necessary to apply the general doctrines to particular cases, and to give a more detailed illustration, or, in other words, to treat of the different kinds of wounds.

1st,—WOUNDS OF THE HEAD.

The most dangerous wounds of the head are punctured, contused, and gunshot wounds. This arises both from the nature of its integuments, and from the primary and secondary affections these injuries produce upon the brain. Incised wounds are the least dangerous of any, and from them patients frequently recover even when the cutting instrument has passed not only through the scalp, but through the bone down into the substance of the brain. They are to be treated in the same manner as in other parts of the body. The patient's head must be shaved, the lips of the wound cleared of coagulated blood, then laid accurately in contact, and retained in that situation by means of adhesive plaster and bandage, and however extensive the wound, it will most generally immediately adhere. If the instrument has struck obliquely, and carried away any part of the external table of the skull which still adheres to the flap, it ought to be treated in the same manner; the piece of bone must not be cut away, but laid down upon the diploe along with the flap, and it will most commonly adhere, as may be seen from the writings of Parè, Wiseman, Le Dran, O'Hallaran, and other practical surgeons. Even if the flaps are irregular and ragged, and much besmeared with mud, after the dirt has been washed carefully away, the lips are brought together, a compress of lint must then be applied to prevent blood from collecting betwixt the scalp and the bone, and to promote adhesion. If the integuments be much bruised and lacerated, still the surgeon must in no case cut them away; they are to be carefully replaced; and if the whole does not adhere, part may adhere. If they inflame and suppurate, warm poultices must be applied; and if abscesses form separating the scalp from the bone, and extending downwards to the occiput or ears, the matter must be discharged by repeated punctures with the lancet; and when the parts begin to granulate, they are again to be laid down for adhesion, while we at the same time keep the surfaces in contact by gentle compression.

The flap should never be cut away, because a length of time is required for new parts to form; and the external table of the skull being thus robbed of its circulation, dies and exfoliates. La Motte seems to have been among the first who adopted the method of laying down lacerated and contused scalps for adhesion, and the practice has been generally followed by the best practical surgeons.

Punctured wounds, or those inflicted with the sword, bayonet, or other sharp points, are more dangerous than incised or even lacerated wounds. They give rise to a species of tumor which involves the whole head and upper part of the face in erysipelas. Although this is attended with some danger, yet it is more connected with the scalp than either with the skull or brain; the patient becomes hot, restless, and extremely feverish; but by purging, bleeding, and keeping up a general perspiration, this erysipelatous swelling of the scalp generally soon disappears; but, if to these symptoms be superadded nausea, vomiting, delirium, spasmodic twitches, and other nervous affections, accompanied by pain on pressure; as these arise from an inflamed fascia, an incision should be made across the injured part down to the bone, which, dividing the inflamed tendinous expansion of the occipito-frontalis, gives such immediate relief, that all these alarming symptoms soon disappear.

It frequently happens, when the head is struck with some degree of violence with a stick or stone, that the scalp immediately rises into a tumor, which is occasioned by effused blood; but this tumor, which rises suddenly, is most commonly void of danger; it should never be opened in the first instance; it generally disappears in a few days, and only requires the application of a piece of linen dipt in some spirituous embrocation. When the blood is effused in the cellular substance, it always disappears in a short time, but it sometimes happens that the blood is under the pericranium, betwixt it and the bone; here the bone is bare, and apt to become carious. In this case, the tumor ought undoubtedly to be opened by an incision; the blood should be cleaned away with warm water and sponge, and the flaps again laid down; the lips of the wound put in contact, and retained and supported by plaster and compress, when they will most frequently adhere. The French Academicians, Messrs Petit, Pott, Lassus, J. Bell, and indeed every modern writer, caution us against mistaking bloody tumors of the scalp for depressions of the skull; the tumor is hard in its circumference, soft in the middle, and the centre yielding from pressure, is very apt by the inexperienced to be mistaken for a depression. Even the great surgeon Mr Sharp was deceived in one instance, and opened a tumor, which might have disappeared of its own accord.

These bloody tumors also frequently arise in new-born infants, when the head has been long compressed in the pelvis, or when instruments have been used during a tedious labour; but by the application of ardent spirits, or cloths dipt in the aq. ammon. acet., the ecchymosed blood is readily absorbed, and the tumor soon disappears.

Contused wounds of the head are always attended with very great danger, from their liableness to be followed by primary or secondary affections of the brain; sometimes a violent blow is inflicted on the head without any wound; it then runs some risk of being little attended to. From the violence of the blow, the skull is contused, the bone dies; the scalp then inflames and separates from the bone, its circulation and life being destroyed. The dura mater, at the same time, separates from the inner surface of the cranium; this is followed by inflammation, pain, abscess, and fever. The brain is then involved in disease; and it is from the connection betwixt it and the bone that all the danger arises. After some days have elapsed, the patient begins to complain of a general soreness over the head, and an acute pain in the injured part when pressed on; he becomes languid, with feebleness over his whole body; has disturbed sleep, attended with frequent startings and frightful dreams; to which there succeeds a general restlessness, with hot skin, quick and hard pulse, especially towards evening; the countenance becomes flushed, and the eyes inflamed. The tongue is foul, and trembles when put out of the mouth; the head is confused, and the patient is seized with frequent rigours, denoting the formation of matter. If nothing is done to relieve him, he is next seized with delirium and the symptoms of oppressed brain, vomiting, convulsions, and stupor. All these alarming symptoms have originally arisen from the contusion of the bone, which is followed by inflammation, suppuration, and separation of the pericranium and dura mater.

If the head be now examined, there will be perceived a circumscribed puffy tumor of the scalp, situated exactly over the dead bone; this tumor is not painful, except when pressed upon, and then may rather be said to be tender than painful; but it is quite characteristic of the death of the bone, and separation of the pericranium and dura mater; for if it be cut into or opened, the pericranium will be found separated, and under it more or less of a dark-coloured ichor; the bone will be of a pale yellow or a dark livid colour, marking its want of vitality; and if a portion of it be removed by the head of the trephine, there will follow a discharge of pus, which has been situated under this diseased portion of bone, generally betwixt it and the dura mater. If the disease has not been early attended to, the pus begins to flow out as soon as the teeth of the saw reach the diploe from the inner table being carious; and it frequently also happens that the dura mater is destroyed, the abscess penetrating into the substance of the brain, and even extending to the ventricles.

Suppuration of the brain rarely arises from a general inflammation, because general inflammation of the brain terminates in effusion; while partial inflammation of the brain ends in abscess. When suppuration, therefore, does occur, it is generally from some local injury, from caries of the skull, or from a scrophulous affection of the mastoid portion of the temporal bone; the bone is there more spongy; the disease is then scrophulous, and the patient sometimes recovers by the abscess bursting through the ear, although he commonly dies.

This contusion of the skull with its alarming consequences is particularly apt to follow blows with a bludgeon or other blunt weapon; it frequently follows gunshot wounds, where the scalp has been bruised by the shot; and it has often occurred on board of ship, from a landsman forgetting where he was, rising up suddenly betwixt decks, and striking his head against a beam.

In the progress of this affection of the bone involving the brain in inflammation and suppuration, we can trace three distinct stages: 1st, The inflammatory action indicated by the general restlessness, hot skin, quick and hard pulse, flushed countenance, inflamed eyes, headach, and other symptoms of fever. 2dly, The formation of matter denoted by the rigors. And, 3dly, Towards the end of the disease, compression pointed out by the vomiting, coma, and convulsions, (although here the patient cannot be properly said to have died purely of compressed brain), while the separation of the pericranium from the bone, and the true nature of the complaint are invariably characterized by the *circumscribed puffy tumor* of the scalp.

When any portion of the cranium is contused and dies, there must either take place exfoliation, or inflammation and abscess of the brain; when the symptoms denote the formation of matter, the trephine should be immediately applied without the least hesitation. This should always be done early, at least as soon as the symptoms point out the formation of matter, while we are directed to the seat of the injury by the tumor of the scalp.

When one or more pieces of the skull have been removed, according to the quantity of matter and extent of the injury, the pus is discharged; the dura mater is relieved from pressure; its surface shoots out granulations, and the ulcer at last cicatrizes; but we must be careful to pursue a strict antiphlogistic plan, and avoid every source of irritation.

But the most dangerous wounds of the head are those inflicted by gunshot. This arises from the force with which the wounding body is impelled, and from the injury generally being extensive. Gunshot wounds of the head are attended with the greatest danger, whether the ball enters or not; if the ball enters, it either lodges in the brain or passes through, and in both cases it produces a dreadful fracture, carrying in pieces of the bone, and generally terminating in death. Again, where the ball does not enter, the bone is so contused that it dies; the dura mater separates within, and the pericranium without; the dura mater inflames, and the brain is soon involved in disease. This death of the bone, and consequent inflammation and abscess of the brain, have taken place merely from the wadding of a pistol striking the head where there was no ball.* Sometimes a ball strikes the skull and produces fracture without depression, and sometimes the internal table is fractured and depressed, while there is only a fissure in the external; although no bad symptoms may immediately follow the injury: in a few days, from the irritation produced by the spicula of the internal table, there succeeds inflammation which terminates in suppuration.

Injuries done to the integuments, cranium, and brain, by gunshot, are the worst that can occur, for there is always great contusion; they must be watched with great attention, but they are not necessarily fatal. Musket-balls have passed through the head, and even stuck in the substance of the brain, and, notwithstanding, the patients have recovered. *

---

* *Vid.* J. Bell's *Principles of Surgery,* Vol. II. p. 425.

So uncertain are all our conclusions with regard to the consequences of injuries of the head, that in no case, however trivial the injury, can we venture to prognosticate absolute safety; nor in any instance, however desperate the wound, dare we predict a fatal termination. Wounds have penetrated the substance of the brain, portions of it have been discharged, and the patients have recovered. A young boy, about six years of age, was amusing himself on the bank at Newhaven, in the neighbourhood of Leith, by throwing stones into the water, trying to skim the waves. In running forward to throw a stone, he fell over the bank, a precipice about twelve feet in height, and pitched with his head upon an angular stone, sticking in the sand: It went through the integuments and bone, and made a wound in the brain. He was carried home, laid in bed, and Dr M'Lean, (the author of a work

---

* For several remarkable cases of gunshot wounds of the head, where the injury was extensive, where musket-balls were lodged, and where the patients recovered, see a paper of Quesnay's in the Memoires de l'Academie Royale de Chirurgie, Tom. II, 12mo edition; and Hennen's Observations on Military Surgery.

on the diseases of St Domingo), who at that time lived at Newhaven, was called in. The Doctor sent for me: when I arrived, I found the boy lying quiet, but not in a state of stupor; his pulse was natural; there was no vomiting, no dilatation of the pupil, nor any symptom of compression or concussion. About a tea-spoonful of the brain was lying upon his hair, and there was a wound above the left parietal bone, near the sagittal suture, into which I introduced my finger, and found that it passed through a ragged opening in the bone down into the substance of the brain. I shaved the head; and in doing it, about a tea-spoonful more of the brain came through the opening in the skull, like yeast working through a bung-hole. No spiculæ of bone or other foreign bodies were detected sticking in the wound; a bit of oiled lint was applied, and the head bound up with a handkerchief. The room was ordered to be kept dark; he was enjoined to have nothing but toast and water, and in the morning he got a purge. For the first three or four days he was easy, and there were no alarming symptoms; but the pulse now began to rise, accompanied by pain of head, heat of skin, thirst, general restlessness, flushed countenance, and intolerance of light, but by blood-letting, purging, abstinence, and quiet, these symptoms soon subsided; no protrusion of the brain followed; the wound healed kindly, and in a short time he recovered perfectly.

In all wounds of the head, from whatever cause they arise, our great aim is to guard against inflammation. We carefully remove all foreign bodies, whether they be gunshot, splinters of bone, or other substances, when they are within reach, and when it can be easily accomplished. When the symptoms indicate compression of the brain, but not otherwise, we have recourse to the trepan to give vent to blood, or to enable us to raise depressed portions of bone; we place the patient in a cool situation, free from light and noise, keep the bowels open, and enjoin abstinence. While we pursue these prudent measures, we watch with attention the rising of the pulse and other incipient marks of inflammation, on the appearance of which we immediately bleed, purge, apply cold lotions to the head, blisters to the nape of the neck, and pursue the system of depletion most rigorously, to prevent, if possible, the formation of matter, which is the never-failing consequence of inflammation of the brain arising from local injury.

WOUNDS OF THE FACE.

The wounds of the face which we most commonly meet with in practice, are incised and gunshot wounds; and in their management, our principal object is to prevent deformity as much as possible. In incised wounds, when the wound is superficial, all that is requisite is to wash away the blood, and to apply strips of black court plaster: when the wound is deep, it will be necessary to have recourse to the suture, and the preferable one is that which we employ for the hare-lip, or rather the common sewing-needle, as we have already recommended.

If the wound is not attended with much laceration or contusion, and the loss of substance is so trifling as to permit us to bring the lips of the wound easily together, it will in general heal very readily, except when complicated with a division of the parotid duct; when this duct is divided, its opposite edges can seldom be placed so accurately in contact, as to adhere and preserve its continuity, and the saliva, instead of passing into the mouth, runs over the cheek; the edges of the wound become callous, and thus salivary fistula is formed. The parotid duct is frequently divided in incised wounds inflicted by accident; sometimes it is cut by the surgeon in the removal of tumors from the cheek, and I have known it wounded in a naval action by splinters, giving rise to a fistula, which proved extremely troublesome. In the extirpation of tumors situated in the course of the duct, the surgeon should, previous to his operation, always introduce into it, from the mouth, the small stilette of a catheter, which will serve as a guide, and prevent the possibility of its being wounded; when it is divided, whether by accident or mistake, we should endeavour to place the wounded surfaces as nearly in contact as possible, and to retain them in that state by plaster and bandage, so as to give it the chance of reuniting, while all motion of the jaws is avoided; but we often fail in this, and the saliva, finding a freer passage outwardly, does not flow into the mouth, but passes over the cheek. In a short time, the wound degenerates into an ulcer, which at length becomes callous, and not unfrequently it shoots forth a fungus, giving it the appearance of a cancerous sore. The discharge of saliva is at all times considerable, and particularly during the motion of chewing, so that five or six ounces of it have been discharged at one meal.

In the treatment of salivary fistula, we may adopt one of three methods of cure: We may make a new passage, by perforating the cheek at the wound with a large needle, armed with a small skein of silk, carrying it obliquely forwards and inwards in the course of the duct. This seton is to be drawn for eighteen or twenty days, till the passage grows callous; we then remove it, stop the discharge outwardly by a piece of adhesive plaster and small compress, when the saliva will flow into the mouth. A second method, and one of the easiest and most effectual, is to introduce a delicate probe from the callous opening into the duct, to feel for its point within the cheek, and then to cut within the mouth a little nearer to the parotid gland than the external wound. We must be sure to cut down to the duct; and the internal opening being thus made nearer the parotid gland than the external opening, the saliva will flow from the moment of the incision into the mouth, and the external wound will be easily healed. The third method, which is very simple, and which I believe will always prove effectual, is, to perforate with a small trocar from the external opening across the duct; to seek out with a probe the end of the duct from the internal wound; to introduce into it a piece of sponge tent, or a leaden wire, which is to be worn till the opening becomes callous; when it is to be withdrawn, the saliva will then flow into the mouth, and the outward wound will heal.

The principal bones of the face consist of thin lamellæ: they are composed of cells which communicate with each other, and which are lined by one common membrane, the schneiderien membrane. From this structure, gunshot wounds of the face are in general not attended with much danger; when a musket-ball strikes the cranium, although it does not enter, the bone is so contused that it dies; the membranes of the brain inflame, and the brain itself is soon involved in disease, which generally proves fatal; but musket-balls have passed among the cells of the face without danger; wounds, which the ignorant have imagined should prove fatal, because they have appeared to pass through the brain, have only passed among these cells where there is no thickness of parts, and no important organs are lodged. From such wound the patient generally soon recovers without one bad symptom; but if it is followed by much swelling and inflammation, producing delirium, or likely to affect the brain, we bleed freely.

It has happened, that a musket-ball has entered near one temple, raked along the frontal sinus, come out at the other temple, and the patient has recovered without one bad symptom; while the ignorant have imagined that it had passed through the brain. Heister, in his "Observations," relates a case where a ball entered at one temple, and passed out at the other; it seemed to pass along the bottom of the orbit, betwixt the eye and the brain, without touching either of those organs. In this course, the optic nerve was destroyed, and the patient immediately became blind; but although the nerve was destroyed, and the wound appeared very dangerous, he was cured in thirty days, without one bad symptom, and, as Heister observes, having nothing to lament but the loss of sight. A ball has passed in an oblique direction, entered betwixt the superciliary ridges, stuck in the frontal sinus, and been trepanned out. In all gunshot-wounds, if the skull is safe, we have considerable hopes of recovery; for wounds of the bones of the face are comparatively of little danger: It is only when a ball enters about the angle of the lower jaw that we are particularly alarmed; and this arises, not from the wound of the jaw, but from the arteries which lie in the course that the ball must traverse. Considerable portions of the bones of the upper and lower jaw have been shot away, and the patient recovered. There is a case related by Wiseman, where a soldier, at the siege of Taunton, had the whole face shot away, and yet they were dressing him on the sixth and seventh day after the accident.

When a musket-ball enters under the angle of the jaw, or passes through it, the first business of the surgeon is to suppress any bleeding which may occur, by compression. He bandages up the jaw, but does not set it; he applies warm poultices every three or four hours, and continues the use of them till the sloughs separate; in ten or twelve days, when the sloughs have come away, he sets the jaw, but it does not immediately unite, as the ends of the bones are surrounded by pus; no bone forms callus while in this state; however, the discharge gradually lessens; the granulations increase in number, and close up the wound; callus begins then to be formed, and the jaw in a short time becomes firmly united.

In all wounds of the face, as it is our object as much as possible to prevent deformity, when a ball has lacerated the cheek or lower lip, as soon as the wound has sloughed and the suppuration is established, the surgeon should bring the torn edges as near in contact as possible, and retain them in that situation by means of adhesive straps or the hare-lip suture, which has a great effect in lessening the deformity.

WOUNDS OF THE THROAT.

In no circumstances can the value of a knowledge of anatomy be so justly appreciated as in wounds of the throat. It is impossible to comprehend the nature, or understand the danger of the accident, without a correct knowledge of the structure of the parts, with their relative situations and connections. We frequently hear of both the trachea and œsophagus being divided by a transverse incised wound, although the slightest examination of the parts will at once shew that it is impossible to cut across the first of these tubes in the whole of its circle, without wounding one or both of the carotid arteries. Again, we frequently hear surgeons unthinkingly talking of both the larynx and pharynx being divided by a suicide. The incision, for instance, passes betwixt the os hyoides and thyroid cartilage; the muscles coming from above, and which are implanted into the os hyoides, pull it upwards; while the sterno-thyroidei powerfully draw the thyroid cartilage downwards: there is a wide gap, and the epiglottis, which is implanted upon the os hyoides, is retracted along with that bone. The os hyoides is the central point into which all the muscles of the throat are implanted; and from it being separated from the thyroid cartilage, the latter is not raised or pulled up in the act of swallowing, consequently the glottis is left uncovered, and part of the drink, food, or saliva, passes into it, exciting suffocating cough. The pharynx again arises from the basis of the skull at the apophyses of the occipital bone; it has only posterior and lateral walls; its posterior part lies against the foreside of the upper vertebræ of the neck; and its lateral walls are attached to the horns of the os hyoides, which also forms a circle or hoop upon which the root of the tongue rests, and to the wings of the thyroid cartilage, which help, in fact, to form the sides of the pharynx. This muscular bag then terminates in the œsophagus, which commences immediately behind the cricoid cartilage. From this structure, it appears evident, that if the wound be above the thyroid cartilage, the pharynx will be opened as soon as the incision has passed through the skin and external muscles, and divided the membrane which connects the os hyoides and thyroid cartilage together; the wound is then above the larynx, and leads into the fauces. In this state of matters, in the act of swallowing, one portion of the saliva or drink will come out at the wound; another portion will pass into the œsophagus; and a third will get into the glottis, exciting distressing cough, and endangering suffocation. From the saliva and drink passing out by the wound, one unacquainted with the structure of the parts, naturally concludes that the wound involves the larynx as well as the pharynx, while, in fact, it is above it, and the pharynx only is opened.

Wounds of the Larynx are always attended with perpetual tickling cough, loss of speech, and the power of swallowing; and, if the external wound is not free, there is emphysema, or escape of air into the cellular substance. Wounds of the larynx are more dangerous than those of the trachea; because this part of the tube, from its higher degree of sensibility, is not only more liable to inflammation; but from blood, saliva, or liquids falling upon the glottis in the act of swallowing, it also excites incessant tickling cough, and is apt to endanger instant suffocation. But the chief and immediate danger in all wounds of the throat is the hemorrhage. If the carotid artery should be wounded, which is apt to be the case when the wound is in the lower part of the throat, it is in general instantly fatal; but if a surgeon be on the spot when the accident happens, he should no doubt endeavour to secure it; or if it be a lacerated wound, he may even arrive in time to take up the vessel deliberately, as the characteristic of these wounds is not to bleed: still in this case, from the contusion of the neighbouring parts, and laceration of the adjoining nerves, the patient will most likely die. In a transverse incision of the larynx passing across the thyroid cartilage, or betwixt it and the cricoid, the superior thyroideal artery is apt to be cut, and this is the vessel which is generally wounded in the attempts of suicides. From its vicinity to the carotid, it bleeds very furiously, and the patient is generally saved by fainting. I was once called to a case of suicide, where there was a very profuse hemorrhage from this vessel. The external incision was five inches in length, freely exposing the inner edges of the mastoid muscle; the razor had passed in an oblique direction; on the right side, the thyroid cartilage was separated from the cricoid, and on the left there was a deep cut in the wing of the thyroid cartilage itself; the left superior thyroideal artery was divided. Before I saw the patient, which was about two hours after the accident, he had lost several pounds of blood, and he was then lying in a state of stupor. Upon opening the lips of the wound, he began to struggle, when the blood rushed out so furiously, and with such a whizzing noise, that I believed it to be a wound of the carotid artery itself. I clapped my finger upon the bleeding point, passed a needle under the vessel, and secured it. Upon deliberate examination, I found it to be one of the superior thyroideal arteries; and although the incision was deep, and extended five inches in length, both the carotids were safe. I brought the lips of the wound together by four or five stitches of the interrupted suture, applied a bandage, and the man recovered. In wounds of the throat, the hemorrhagy may not be so profuse as to induce immediate death from the quantity of blood lost, but the blood may get into the larynx or trachea, and produce suffocation ; or, from the accident passing unobserved, it may escape so slowly as not to occasion instant death, and yet produce such a degree of debility that the patient dies in twenty-four or thirty hours. This is very apt to be the case in wounds of the thyroid gland, which, from its great vascularity, bleeds profusely.

In all wounds of the throat, our first object should be to suppress the hemorrhage: We draw the arteries out with the forceps, or pass a small needle armed with a ligature under them, and tie them ; our next care should be to prevent the access of the blood into the larynx or trachea. For this purpose, we lay the patient on his belly instead of his back, as is generally done, with his head reclining over the bed or couch, and do not dress the wound till the general oozing ceases ; we bring the edges of the wound together by means of the interrupted suture, passed through the integuments and muscles quite down to the cartilages, but not through them : some writers recommend to carry the stitches through the trachea, but this never should be done, as it not only excites suffocating cough, attended with great difficulty of breathing, but is also productive of inflammation in the lining membrane of the tube, which is generally followed by effusion and death: when all the stitches are passed and tied, we lay in their interstices slips of black court plaster, apply a bit of lint, and a linen or cotton roller. The head, by means of a bandage, should always be bound down to the breast, otherwise, by tossing it upwards, and by the perpetual motion of the jaw, the stitches are apt to be torn out; when this happens, they should be immediately replaced, as it is only by stitches that this wound can be speedily cured. After the wound is dressed, it is of the utmost consequence to prevent the action of swallowing, as it tears out the stitches, and forces open the wound; a hollow bougie should, therefore, be passed into the œsophagus through one of the nostrils; through this tube we pour into the stomach beef-tea, melted jellies, wine and water, milk, and other kinds of liquid nourishment; the tube may be every time withdrawn, and again introduced, or it may be allowed to remain, and only withdrawn occasionally.

Although the wounds of the larynx and trachea that most commonly present themselves in practice be incised wounds, still we frequently meet with punctured wounds; and where the external wound is small, they are always accompanied by emphysema. It has been known that the rings of the trachea have separated in labour, permitting the air to escape into the cellular substance, causing emphysema of the neck and face, and both the trachea and larynx have been burst by a blow. In such injuries, independently of the emphysema, there follows a tormenting tickling cough, accompanied with such considerable inflammation, as generally terminates in effusion or ulceration, and death. To permit the escape of the air from the cellular substance, we make several punctures with the lancet; and to promote its absorption, we gently and repeatedly rub the parts with the hand, lubricated with oil or other unctuous substance; to appease the cough, we have recourse to opiates; and to subdue the inflammation, to bloodletting and other auxilliary branches of the antiphlogistic treatment.

The Œsophagus, from its concealed situation, cannot be wounded to any great extent without such injury to the trachea, bloodvessels, or nerves, as generally terminates in death; however, cases have occurred, where the tube has been partially wounded in its circle, and the patients have recovered; such wounds are less dangerous when inflicted by a clean-cutting instrument, than when lacerated or torn. The nature of the wound is at once detected from its depth, and from liquids passing out by the wound in the act of swallowing. The œsophagus is a muscular tube, and will very readily heal. Our chief care is to keep the opening from becoming fistulous, by preventing the food or drink from passing through it. For this purpose, after we have secured any bleeding vessel by ligature, we bring the edges of the outward wound together, pass through them one or two stitches of the interrupted suture, apply our adhesive straps, compress, and bandage, and then, as in wounds of the windpipe, carry a small elastic gum tube or large catheter through the nostril into the œsophagus past the wounded point, through which we pour soups, jellies, milk, and other liquid nourishment. This instrument will lie easy in the passage, and need not be withdrawn every time after feeding the patient, but only occasionally to clean it. We keep the patient cool and quiet, and direct our chief attention to obviate inflammation.

WOUNDS OF THE BREAST.

We should naturally imagine, that where a small sword or a musket-ball had passed through the thorax, the patient could not long survive; but this is by no means the case. Wounds of the heart, aorta, or root of the lungs, are no doubt fatal, but it often happens that a man is run through the breast with a sword, or that a musket-ball passes directly across the cavity through the substance of the lungs, and the patient not only recovers, but there is hardly one bad symptom during the cure.* In wounds of the chest, those caused by gunshot are less dangerous than those inflicted by sharp instruments, because there is less hemorrhagy; the ball tears or contuses as it passes along; whereas, when the lungs are wounded by a sword, blood is not only effused into the thorax, oppressing the lungs, and causing great difficulty of breathing; but it is also poured out into the bronchia or air cells, endangering suffocation. Wounds of the head or abdomen are less dangerous when inflicted by a sharp instrument,—more dangerous from a ball; in the thorax it is quite the reverse; there is less danger from a ball,—more from a sharp instrument.

---

* Cases of this kind are recorded in Belloste's Hospital Surgeon; in Aitken's Navy Surgeon; in the Memoirs of the Royal

Wounds of the breast may be divided into those which simply penetrate, and those which not only penetrate but injure the contained viscera. In a simply-penetrating wound, unless blood be effused from the intercostal or internal mammary arteries preventing the expansion of the lungs, and impeding the function of respiration; or unless the wound be so large as to give admission to the external air leading to compression of the lung of the wounded side, the patient generally recovers; and in the progress of the recovery, we do not find those alarming symptoms of inflammation which many writers have described, and

---

Academy; in Heister's Observations; in Lamotte;and in other works.

which we should naturally imagine would occur from the exposure of the cavity of the chest to the external air. It is when the contained viscera are injured, that wounds of the breast are chiefly fatal; and this arises, 1st, From the hemorrhagy producing death, by the quantity of blood lost, or being poured out either into the cavity of the chest, or into the air cells, or into both, producing suffocation. 2dly, From the inflammation which succeeds. 3dly, From the suppuration which often follows wounds of the chest, particularly those inflicted by gunshot; and, 4thly, From phthisis or hemoptysis, which may follow subsequent to the cure of the wound of the chest.

We should naturally imagine, that there could be little difficulty in determining whether a wound had penetrated the chest or not; but this is far from being the case either in wounds inflicted by sharp instruments, or caused by gunshot. It sometimes happens, that a small sword enters the pectoral muscle, passes through the axilla, and comes out behind through the latissimus dorsi; or sometimes a musket-ball strikes the chest, and neither penetrates nor fractures the rib, but runs round the convex and outer part of the cavity, coming out behind. Both of these wounds are occasionally attended with partial emphysema, from the air entering the wound in expiration; and being forced into the cellular substance in the rising of the chest in inspiration, and at first sight might lead the surgeon to imagine that the wound had penetrated, when it had passed externally to the ribs and intercostal muscles. Without having recourse to probes or injections, agreeably to the directions of many writers, I believe that wherever the wound is at all free, it may in general be ascertained if it has penetrated, by the whistling or hissing blast of air which is emitted, although I do not conceive this knowledge to be of any moment. No surgeon should venture to decide, at first sight, on the fate of his patient, for men have died of wounds which were at first believed to be so trifling as to be attended with no danger, while others have recovered after being wounded in the most dreadful manner. It is by the symptoms alone that we are called upon to act; and if the patient were easy, I should certainly not make very minute enquiries, place him in a variety of postures, or tease him with probes or injections.

Wounds of the breast are more or less dangerous, according to their extent and the nature of the parts involved. Sometimes a musket-ball strikes the chest, fractures a rib, and yet the ball does not enter; sometimes a small sword or musket-ball enters the chest, passes through the lungs, and comes out at the opposite side, but no great vessel is wounded; a little blood is coughed up from the trachea, but otherwise nothing material happens. Sometimes the wounding instrument or ball passes nearer the root of the lungs; a large vessel is wounded; blood is poured out both into the bronchia and into the chest; the patient coughs up florid and frothy blood with a rattling noise; his breathing becomes more and more oppressed; he is not able to lie down, but sits erect with his body bent forwards; his extremities become cold; his pulse feeble, and in a short time he expires. And sometimes a ball enters the chest, does not pass through, but remains lodged, producing tedious suppuration and profuse discharge of matter, protracting the cure and endangering life.

When the instrument merely penetrates the chest, without injury to the lungs or other contained viscera, and when the intercostal and internal mammary arteries escape, so that no blood is effused into the cavity of the thorax, the symptoms are frequently not alarming; but when the lungs are wounded, there succeed great difficulty of breathing, cough, bloody expectoration, frothy, and of a florid colour, with a discharge of blood of the same colour and appearance by the wound, accompanied by a hissing noise; and if any large vessels are opened, all the marks of internal hemorrhage follow, such as fainting; quick, feeble, and irregular pulse; cold extremities; pale countenance, and lividity of the lips. The consequences of such a wound, are extravasation of blood into the cavity of the chest and into the bronchia, endangering suffocation, and causing short laborious breathing, with indescribable anxiety. This extravasation is always denoted by the general oppression and difficulty of breathing; by the patient being able to lie only on the wounded side; by a sense of weight upon the diaphragm, and stricture of the chest.

When a wound in the chest is free, the air which escapes from the lungs passes out by the external wound with a hissing noise; but when the external wound is small or oblique, it often happens that the air is forced into the cellular substance, at first forming a tumor in the immediate vicinity of the wound. In the course of an hour or two, it extends over the whole chest upwards to the neck and throat, producing a sense of straitness and suffocation; then up to the face, swelling the eye-lids to such a degree that the patient is unable to open them, and thus producing blindness; it at the same time proceeds downwards, so that the belly, thighs, and still more particularly the scrotum and penis, are painfully distended to an alarming degree. The air is so elastic, that when it escapes into one side of the chest, it forces the mediastinum over to the opposite side, hindering the free expansion of the sound lung; it presses the diaphragm downwards, prevents its motion, and thus abridges the chest in all directions. The patient complains of a tightness or corded feeling at the pit of the stomach, marking the interruption of the function of the diaphragm. This effusion of air into the cellular substance is called emphysema; and when the tumor is felt in its incipient stage, it communicates to the surgeon's hand the same sensation as when he compresses a bladder half-filled with air, or crushes a piece of paper in his hand. When the disease is more extensive, and the whole cellular substance inflated, it sounds like "a wet drum," when struck, and has a very alarming appearance. *

Emphysema most frequently follows wounds of the lungs from fractured ribs or the bayonet; as from their slanting direction the air does not so readily escape at the outward wound, while again in open wounds or in gunshot wounds this accident is very rare; because, as soon as the air escapes from the lungs, it gets freely out by the external wound in the chest. I have found emphysema to occur generally where there was no external wound, as in those cases where the surface of the lungs was abraded by the spicula of a fractured rib; and we have the best authority for saying, that emphysema is not near so frequent in wounds of the chest as has been described by surgical writers, and is generally imagined. †

The chief dangers attendant on wounds of the breast, are four. 1st, Hemorrhagy, which causes

---

* For an admirable description of Emphysema, with some valuable remarks on wounds of the breast, see Discourses on the Nature and Cure of Wounds, by J. Bell.

† *See* Hennen's *Observations on Military Surgery.*

death by the quantity of blood lost, or by the effusion into the chest and air cells, producing oppression of the lungs and suffocation. 2dly, Inflammation, which is peculiarly apt to follow all wounds of the great cavities, and which from its extent often terminates in suppuration or effusion. 3dly, Suppuration; for after the first dangers are over, abscess, hectic fever, spitting of blood, and consumption, sometimes follow. This is particularly apt to happen when any portion of the clothes or splinters of bone have been carried in, or where the ball itself remains in the chest. 4thly, Emphysema; although emphysema be in general more alarming than dangerous, still, when extensive, it produces great oppression, hurried and difficult respiration, and even endangers suffocation. We must keep these four dangers in view, because they regulate our practice in all wounds of the breast.

1st, If a sword or musket-ball passes directly across the chest, the lungs will most probably be wounded, which is denoted by more or less blood coming up by the trachea; in such a case, we lay the patient in bed with his head raised. If any splinters of bone are loose at the entrance and exit of the ball, we pick them away; we then apply a little lint to each orifice, and lay the patient in an easy posture in bed; but above all we bleed largely to stop the hemorrhage, to lessen the quantity of blood passing through the lungs, and thus relieve the breathing, and to obviate inflammation; and we repeat the bleeding in proportion to the hemorrhage, and to the age and plethoric state of the patient.

2dly, It sometimes happens that a sharp instrument or musket-ball passes so near the root of the lungs as to wound some large vessels; a considerable effusion of blood succeeds: blood is poured out both into the cells of the lungs, and into the cavity of the chest; that which passes into the cells is coughed up with a rattling noise, and that which escapes into the chest gradually accumulates till the wounded lung not only is oppressed but also the diaphragm, mediastinum, and lung of the opposite side; there is great difficulty of breathing, and indescribable anxiety. In this case, we must bleed very freely to lessen the internal hemorrhage, while we at the same time endeavour to get the coagulated blood out of the chest, by laying the patient on the wounded side, and hooking it out with the finger, or washing the chest out by an injection of tepid milk.—This must be repeated as often as the oppression and difficulty of breathing return, and continued till the hemorrhage ceases, which it generally does in 48 hours. If the wound is not sufficiently free, we enlarge it; or if it is in the upper part of the breast, or so situated that the extravasated blood cannot be removed by it, we make another opening in the lower part of the chest, betwixt the sixth and seventh true ribs, counting from above downwards, and half-way betwixt the spine and the sternum. Such a case is very dangerous; but no patient must be abandoned; men have recovered even in these desperate circumstances.

3dly, It sometimes happens, that a bullet enters the chest, and passes through the edge of the lungs; that there is little bleeding into their cells; but that at its entrance it has so fractured the rib, as to wound the intercostal artery; the artery pours its blood into the chest, and in a few hours the same oppression and difficulty of breathing take place as in the last case; but the danger is not so great as when the blood comes from the lungs. Here we enlarge the wound, and secure the bleeding vessel either by tying it, or we compress it by a piece of sponge niched in betwixt the ribs, and to which a ligature is attached. We remove the blood from the thorax, in the same manner as when effused from the lungs.

4thly, In gunshot wounds, it sometimes happens, that a splinter of bone, a portion of the clothes, or the ball itself, remains in the chest; and when the first dangers are over, viz. hemorrhage and inflammation, and the patient apparently recovering fast, an increase of pain unexpectedly arises, with a fresh attack of fever, the formation of an abscess, and a copious discharge of matter. In this case, we must endeavour, by enlarging the wound, by feeling with the finger, and by washing out the chest by means of injections of tepid milk, or milk and water, to remove the foreign body, when the wound will most commonly soon heal; but if the discharge should still continue profuse, attended with a wasting hectic, we must have recourse to a light and nourishing diet, bark, wine, and country air, while we allay irritation by means of opiates.

5thly, If the air emitted by the wounded lungs does not escape freely by the external wound, but insinuates itself into the cellular substance, forming emphysema; the surgeon, as soon as the tumor is formed, should make several punctures with a bleeding lancet in the immediate vicinity of the wound; and as soon as the air is evacuated, he should apply a piece of adhesive plaster or a bit of lint, with a compress of linen, and pass a bandage round the chest, moderately tight, which not only prevents farther effusion, but restrains the motion of the ribs, and thus gives considerable relief. If the air be generally diffused, in addition to the punctures which we make in the immediate vicinity of the wound, it will be requisite to repeat them in various parts of the body wherever the air is collected; and after lubricating the hand with oil, to stroke the skin, and press the air towards the openings, so as to free the cellular substance of the effusion.

In all wounds of the breast, whether inflicted by gunshot or sharp instruments, we should close the wound, as after the operation of empyema, either by bringing the integuments over it, or by adhesive plaster. If blood is effused, giving rise to anxious and laborious respiration, we should no doubt attempt to evacuate it before we apply the dressings; we remove the dressings from time to time to give exit to the extravasated blood, after which we again close the wound. The immediate closure of the wound hinders the access of the external air, lessens the danger of inflammation, and prevents the formation of emphysema. *

While we give these general directions for the management of wounds of the chest, we must recollect, that when the wound is inflicted by gunshot, we employ no dilatations from its being a gunshot wound. It is only to remove blood, to extract the ball, pieces of the clothes, or splinters of the ribs sticking in the lungs, that we ever think of dilating, and we have recourse to tents and setons on no account whatever. Our great leading points of practice in wounds of the breast are, in the first instance, to bleed largely to lessen the hemorrhage, and to avert inflammation, to free the chest from effused blood, and then invariably to close the wound; to remove emphysema by puncture, and to prevent its recurrence

---

* In the treatment of wounds of the breast, the ancients always closed the external wound; the moderns, in general, keep it open to evacuate the blood. Those who direct the wound to be kept open, are chiefly speculative writers; while practical writers, as Larrey and Hennen, direct to close the wound.

by compress and bandage; and in the second stage, to support the patient's strength by nourishing diet, bark, sulphuric acid, and country air, more especially where there is a profuse flow of matter; to allay irritation by opiates; and if we suspect the discharge to be kept up by any extraneous body, to endeavour to find it out, and remove it.

WOUNDS OF THE BELLY.

Wounds of the belly, when accompanied with injury of the contained viscera, may in general be considered as mortal. The abdomen is so full of large bloodvessels, and of organs so essential to life; its viscera have such an intimate connection with life by means of an extensive circle of great and important nerves; the contents of the stomach and intestines, the urinary and gall bladders are so apt to be extravasated, and the cavity is withal so susceptible of inflammation, that the patient can hardly escape. Cases have, however, occurred, where both the fixed and floating viscera have been wounded, and where even small swords and musket balls have passed through the belly, yet the patients have recovered.

The bloodvessels supplying the viscera are so large, and the liver, spleen, and kidney so vascular, that the danger of a fatal hemorrhage is very great. From the profuse distribution of nerves, and the manifest connection the contained viscera have with life, more especially the stomach and small intestines, wounds of them are always attended with sinking of the pulse, fainting, and cold extremities. It is from this extensive nervous sympathy that the swallowing of poisons, cholera morbus, and even common diarrhœa, are always immediately followed by deadly sickness, and great prostration of strength. From the retraction of the muscular fibres of the stomach and intestines, their contents are apt to escape into the abdomen, more especially when wounded transversely, when they are full and when the wound is extensive. The peritoneum is, in its nature, extremely prone to inflammation; and from its extensive continuity of surface, the inflammation spreads rapidly, and is always violent in degree.

From these considerations, it appears that in wounds of the belly the chief dangers are hemorrhage; immediate death from a failure of the nervous energy; effusion of the visceral contents, and peritoneal inflammation. When a sharp instrument or a musket ball wounds the aorta, the vena cava, the thick substance of the liver or spleen, or any great vessel, there immediately follows such a hemorrhage that the patient dies. When the hemorrhage is profuse, he dies from the quantity of blood lost, and the rapidity with which it is discharged; his belly swells; his breathing becomes laborious; his extremities cold; his lips livid; his countenance pale and sunk; he is covered with a clammy sweat, and in a short time he expires. But when a small vessel is wounded, the hemorrhage is not so great as to sink the patient, and prove fatal from the quantity lost, or from the quickness with which it is discharged; the blood escapes slowly, it is poured out into the abdomen, coagulates, is collected round the wounded vessels, and in a few days excites an inflammation which destroys him. Fatal hemorrhage may succeed to wounds of the epigastric artery where none of the viscera are touched, but where the cavity is only penetrated. This has happened from the trocar transfixing this vessel in the operation of paracentesis. Notwithstanding the size and number of the bloodvessels within the abdomen, it is astonishing how frequently its viscera are wounded without fatal hemorrhage ensuing; both the liver and spleen have been wounded deeply, and the patients have recovered.

The second danger which we enumerated as attendant on wounds of the belly, was a sinking of the nervous energy or vital powers. This symptom is more apt to follow wounds of the stomach and duodenum than those of any of the other viscera; hence wounds of the stomach are generally attended with cold sweats, a failing of the pulse at the wrist, which is scarcely perceptible, and faintings. These symptoms rarely terminate in death; although blows upon the stomach (such as those received in boxing) have often proved fatal, without the rupture of a blood-vessel or any apparent injury. When this sinking of the vital powers prevails to any great extent, we have recourse to general heat, to the application of bottles of hot-water to the feet, and of ammonia to the nostrils, while we at the same time exhibit internally a little brandy or warm wine.

The third danger in wounds of the abdominal viscera, is effusion of the visceral contents into the sac of the peritoneum. It is astonishing how seldom effusion takes place; and it is wonderful how rapidly the peritoneal inflammation succeeds, terminating in that adhesion, which repairs the breach, and effectually prevents effusion. If we search the records of surgery, we shall find, that in penetrating wounds there is seldom any effusion, the universal pressure of the diaphragm and abdominal muscles preventing such an accident. It is only when an intestine is ruptured to some extent by a blow, or when its coats are ulcerated, that effusion follows. Even in ulceration the contents of the gut are not immediately thrown out, the universal pressure prevents it for a time; but as in this case there is no disposition in the peritoneum to inflame and close up the breach, the contents will no doubt at length escape. The villous coat of the intestines is a mucous membrane; when inflamed, the termination of the disease may be in ulceration; and as soon as the ulceration takes place, the inflammation ceases. It does not extend to the peritoneum; hence the intestines and parietes of the abdomen remain unconnected, and the contents are apt to escape into the abdominal cavity. The peritoneum inflames chiefly in consequence of wounds, difficult labours, preternatural distension, or bursting of the urinary bladder; and after the operations of hernia and lithotomy, but not in ulceration of the intestinal tube, or at least not till such time as the extravasated visceral contents have excited it. In penetrating wounds, the abdominal and intestinal peritoneum inflame at the same time, the membrane throws out a gelatinous effusion, which closes up the breach by adhesion, while the universal pressure prevents the effusion till this salutary process takes place, which happens even in a single day. This appears to be the reason why effusion seldom occurs in penetrating wounds, and why it is so frequent in ulceration.

When the contents of the stomach, intestines, urinary or gall bladder, are poured out into the abdomen, or when blood is effused in great quantities from the liver or spleen, violent inflammation succeeds, and the patient always dies; whereas if no effusion supervene, and the peritoneal inflammation can be kept under, he is in a great measure safe. The escape of the bile or urine, from the acrimony of these fluids is most productive of inflammation, then the contents of the great intestines, then the contents of the small intestines and stomach, and the effusion of blood *is* the least dangerous of all; but if any of them occur to a considerable extent, inflammation soon succeeds, and the patient dies in the greatest misery. However, as has been already remarked, this effusion does not take place so often as we should naturally imagine. It is prevented by the universal pressure, and only occurs when the stomach and intestines are full, or when the wound is very large; and if it can be resisted only for a few hours, all is safe; the peritoneum immediately inflames, and as it is a serous membrane, the first effect of inflammation is adhesion; the wounded bowel adheres to the peritoneum, lining the abdominal parietes, or to that portion of a sound intestine, whose peritoneal covering is in the same inflamed condition, and in immediate contact with it; and thus in a short time all effusion is effectually prevented. *

The last danger is peritoneal inflammation, and our chief care should be to avert this by copious bleeding. When the peritoneum inflames, and the wounded bowels adhere, the inflammation, by a law of the animal economy, generally ceases, but frequently it overspreads the whole cavity. The belly swells, becomes tense and hard, extremely tender, and so painful to the touch that the patient is unable to bear the weight of the bed-cloaths; vomiting and hickup succeed, with great restlessness, and generally diarrhœa attended with evacuations of blood; the visage is pale and ghastly; the tongue parched; there is great thirst; and the pulse small and quick. If the progress of the inflammation is not early arrested, an effusion of blood-coloured serum generally supervenes; and, after death, we find two or three pounds of this serum in the abdomen.

---

* See Mr JOHN BELL's Discourses on Wounds, where " this tendency of the peritoneum to inflame, which is the chief cause of danger," is shewn by a variety of illustrations to be " also the only means of safety."

Superficial wounds of the belly are in general simple; they are all referable to the rules already laid down for the management of wounds in general. Those, therefore, which demand our chief attention, are such as penetrate the cavity, or injure any of the contained viscera. Wounds of this description may be arranged under four heads. 1st, Wounds, which simply penetrate the cavity, without injuring any of its contents. 2dly, Wounds which not only penetrate, but injure one or more of the contained viscera, without protrusion of the wounded organ. 3dly, Wounds attended with protrusion, without any wound of the protruded bowel. 4thly, Wounds not only accompanied with protrusion, but with injury to the exposed bowel.

1st, Wounds, which simply penetrate the abdominal cavity, are the least dangerous of the four species now enumerated; yet, when the wound is extensive, it is sometimes followed by violent peritoneal inflammation. The external surface of the peritoneum is not apt like the internal to inflame; hence we find, that in wounds of the parietes of the abdomen, if this membrane is not opened, little inflammation supervenes.

Our great object in the treatment of simply penetrating wounds should be to attempt to procure adhesion, leaving our future conduct to be regulated by the symptoms. When the wound is of small extent, we never use sutures, most especially when it is longitudinal, and upon no account whatever do we introduce a tent. We attempt to heal the wound by position, plasters, and bandage. The introduction of sutures has sometimes given rise to vomiting, hickup, pain, and other symptoms of peritoneal inflammation, which, after the removal of the stitches, have abated, and at length entirely disappeared. The passing of sutures through the peritoneum is not without danger, being apt to excite inflammation; I should therefore rather trust to plasters and bandage, unless when the wound is transverse and of great extent; in such a case, we are forced to have recourse to the suture; and in doing so, we use two surgical needles. To guard against wounding the bowels, we always pass them from within, carrying them outwards through the peritoneum, as well as through the other coverings of the abdomen. In order to obviate inflammation, the occurrence of which is chiefly to be dreaded in all wounds of the great cavities, we keep the patient low and quiet, unload the bowels by cathartics and glysters, and have recourse to bloodletting, in proportion as the patient complains of pain on pressure, and the pulse rises.

2dly, In those wounds which not only penetrate but injure some of the viscera, the danger is very great, and is always in proportion to the vascularity of the wounded organ, to its importance in the animal economy, to the risk of escape of its contents, and to its liability to inflammation: Thus wounds of the liver, the spleen, the stomach and small intestines, the urinary and gall-bladder, are particularly dangerous, not only in consequence of the inflammation which succeeds, but from the risk of a fatal hemorrhagy from the two first mentioned organs, and the chance of effusion from the four last.

Although it is, no doubt, frequently difficult to calculate the direction of a sharp instrument, or the course which a ball takes in its passage through the belly, still our knowledge of anatomy, with the existing symptoms, will often lead us to guess pretty accurately what viscera are wounded; but this knowledge is often of little importance, as we never think of enlarging the external wound to reach the injured organ. It is only when a wound of any of the viscera is accompanied with protrusion, that we can do any thing in the way of manual operation; in every other instance, all we can do is to obviate or repress inflammation: we entrust the rest to nature.

When the stomach is wounded, vomiting immediately succeeds, generally mixed with blood, and an escape of its contents at the external wound frequently takes place, attended with cold sweats, a sinking of the pulse, so as to be scarcely perceptible at the wrist, fainting, and coldness of the extremities; with these are frequently combined hickup, constant nausea, and violent thirst. When an intestine is wounded, blood is evacuated by stool, and its contents are sometimes discharged by the external wound. When the large intestines are wounded, this discharge is feculent; but thin and slimy, when the wound is in the small intestines. Wounds of the small intestines are always more dangerous than those of the large, because the former are not only more vascular and more irritable, but perform a function more immediately directed to the support of the system. When the liver is wounded to some depth, a sinking of the pulse immediately follows, with a swelling of the belly, coldness of the extremities, paleness of the countenance, lividity of the lips, and in short the same symptoms which accompany internal hemorrhage. When the wound is not so extensive as to involve its large vessels, it is succeeded by swelling, great pain on pressure, vomiting, and all the symptoms of acute hepatitis. When the urinary bladder is wounded, the urine is tinged with blood; and if this viscus has been in a distended state, the urine escapes into the abdominal cavity, and is followed by violent peritoneal inflammation, and death.

Although every patient must be accounted in imminent danger when a sharp instrument, or a musket-ball, has passed through the belly, still the wounds of some viscera are more dangerous than others: thus wounds of the bladder, when full, especially in its fundus, are particularly dangerous, from the unavoidable escape of the urine into the abdomen; next to these follow wounds of the liver, the stomach, and the small intestines; and wounds of the colon are the least dangerous of all.

Sometimes a musket-ball does not pass through, but lodges in the belly; sometimes it sticks in the fat about the loins, producing suppuration and hectic fever, of which the patient dies after months of suffering; sometimes it enters the body of the vertebrae, producing paralysis of the bladder and lower extremities; and I once knew a case where a pistol-ball in a duel entered a little above the pubes, dropt down into the pelvis, and formed a sac for itself close by the neck of the bladder, where it remained for years, exciting the same irritation that a stone in the bladder does' after riding on horseback, or driving in a carriage.

In all wounds of the abdominal viscera, when there is no protrusion, our great object is to obviate inflammation; if a profuse hemorrhage succeed, or if the contents of the bladder or intestines escape into the abdomen, the patient inevitably perishes; otherwise he is in some measure safe. To all these wounds more or less swelling and tension of the abdomen succeed, with pain on pressure, quickness of pulse, and other symptoms of peritoneal inflammation; and our whole practice is directed to subdue this inflammation. We lay the patient in a horizontal posture, keep him low and quiet, interdict all solid food and large quantities of liquids as apt to distend the bowels. We bleed largely, unload the intestines by means of clysters, and pursue the strictest antiphlogistic regimen. For the first two or three days, we give nothing stronger than toast and water, barley-water, milk and water, or perhaps a little animal jelly; and we are regulated entirely by the symptoms. Should the pulse rise, the belly swell, and become hard and painful to the touch, we renew the bleeding, and repeat it again and again, till every alarming symptom cease; at the same time, it will be advisable to foment the belly, use the warm bath, and keep the bowels clear: in short, the great objects which we have in view, are to avoid every source of irritation, and to keep the actions of the system low. If the wound has been inflicted by gunshot, we neither dilate nor probe with the finger, or any instrument. If the ball has not passed through, and can be felt under the integuments, we cut upon it and extract it; we then apply a little lint to both wounds, and a warm emollient poultice to that inflicted by the shot. In gunshot wounds of the stomach or intestines, the food or fæces is in general not discharged by the wound till the slough separates. In wounds of the urinary bladder, if the urine does not escape into the abdomen, the patient will in general recover. To prevent this escape in all such wounds, we should immediately introduce into the bladder, through the urethra, an elastic gum catheter. This insrument should be retained and kept open, which will give passage to the urine as soon as it comes into the bladder, and lessen the danger of escape.

3dly, In wounds of the abdomen, there is a tendency in the bowels to protrude; this is particularly the case when the wound is produced by a sharp instrument. This protrusion of the bowels may present itself under two forms, either that of simple protrusion, unaccompanied by a wound of the protruding bowel, or it may be complicated with such wound. The omentum and the alimentary canal are the parts which most commonly protrude; they should, if in a state of health, be immediately returned, and this is in general easily effected; for in such cases, they are rarely in a state of strangulation, as in hernia. If the opening is so small as not to permit the return of the protruded bowels, it must be enlarged; and in doing so, the surgeon should always make his incision in the upper and not in the lower part of the wound. Protrusions of the bowels are more apt to occur in the lower than in the upper parts of the abdominal parietes, as these are the points most acted upon in the erect posture, the weight of the parts being added to the force of contraction of the diaphragm and abdominal muscles; hence we find hernia occurring more frequently through the inguinal canal, under Poupart's ligament, and in the walls of the lower parts of the abdomen, than at the umbilicus or upper parts of the cavity, although the umbilicus be the weaker point, where the opening is less protected, and more direct.

In enlarging the wound to permit of the easy return of the protruded parts, all that in general is requisite is to divide with a scalpel to a small extent, the skin, cellular substance, and muscles, beginning at the upper edge of the wound. There is seldom any necessity for cutting the peritoneum; after the external coverings are divided this membrane yields so as to permit the bowels to be readily returned; if not, it must be divided, and this is easily done by inserting a grooved director, and carrying along it a probe-pointed bistory. However, as has just now been observed, the bowels protruding through wounds are rarely in a state of strangulation; and in those cases in which I have seen any difficulty in returning them, it arose not from the smallness of the opening, but from the intestines being distended with air. On one occasion, where the intestine was protruded to the size of the head of a new born child it could not be returned, although the opening was enlarged and made quite free, the intestines were much distended with air, and it looked as if the belly was already too full to receive any more. In such a case, Parè, Dionis, and others of the older surgeons, recommend to prick the intestine with a round needle, to allow the air to escape; but the preferable practice is to attempt to squeeze back the air into that portion of the intestine which is within the abdomen. If this is found to be impracticable, we throw into the rectum repeated syringefuls of a cold solution of salt in water. This will immediately make the gut contract, expel the flatus by the anus, and enable the surgeon readily to reduce the prolapsed parts.

The prolapsed bowels, unless in a state of gangrene, should be returned as soon as possible; if they are covered with dust, they must be bathed with warm water or with milk and water; but no time should be lost in fomenting them, as nothing can tend more to prevent danger, than immediately replacing them in their natural situation. The omentum can always be more easily returned than the gut, from the latter being distended with flatus; it should be reduced after the intestine; and in returning the intestine, we should be careful, as in hernia, to return that portion first which was last protruded; and so on in succession, till the whole is reduced. This enables the bowels to resume their natural position in the belly, by which there is less danger of exciting irritation, and inducing inflammation, than when they are returned *en masse*. We then have recourse to plasters and the uniting bandage, or to sutures, according to circumstances; and employ all those means already recommended for preventing or subduing inflammation.

4thly, The last division of abdominal wounds, which we have to consider, are those in which there is not only protrusion of some of the viscera, but where the protruded bowel is at the same time wounded. This most frequently occurs in some portion of the alimentary canal, and the opening in the intestine may be very small, or the gut may be largely wounded. If there is only a small opening in the intestine, such as will admit a crow quill, it neither requires a suture, nor is it necessary to fix it at the external wound; we may return it without hesitation: the internal or villous is so loosely connected with the muscular coat that it shifts its place, and closes up the wound; and this circumstance, combined with the universal pressure, prevents all escape. It is only when the intestine is divided transversely, or to some extent, that the muscular fibres retract, and permit the escape of the alimentary contents. In such cases, there are two modes of procedure, either to stitch the wound in the intestine, and then return it into the abdomen, or to reduce the gut, and fix it by a ligature at the external wound. Each of these methods has had its advocates.

From the rare occurrence of wounds of this description, the stitching of an intestine has been more frequently treated of by speculative than by practical writers. A variety of sutures have been recommended, and numerous expedients have been proposed, to close the wound without lessening the diameter of the gut. The most ancient, and the one most generally recommended by systematic writers, is the glover's suture, which is formed by carrying the stitches through the lips of the wound, from within outwards. The surgeon takes a fine needle, armed with a small thread; he enters it from the inside of the gut, carries it outwards through one lip of the wound, then inwards through the opposite lip, then outwards again, and so on, till he sews up the breach, making the stitches close to each other, and fastening the last with a knot, but leaving the ligature long at the commencement of the suture, which is to be brought out at the external wound, and by which, at the end of a few days, when the gut, has united and the ligature becomes loose, it is to be withdrawn. After the intestine has been stitched, it is to be returned, and the external wound closed by the interrupted suture.

In transverse wounds of the intestines, where the gut is divided in its whole circle, it was proposed by Rhamdor, to pass a piece of tallow candle into the upper end of the divided intestine, then to introduce this portion of the gut, for some way, into the inferior part, and to secure it so by an uninterrupted suture. The Rhamdorian is also the operation recommended by Mr Benj. Bell: but we may remark, that it is impossible to introduce one extremity of the gut within the other, the mesentery effectually prevents it, unless this membrane be separated to some extent from the intestine; a proceeding which would endanger hemorrhage.

A third method of stitching an intestine, is that which was proposed by Le Dran, and which is termed the Loop Suture. It is formed, by passing, by means of straight small round needles, in the manner of the interrupted suture, as many threads as are required, at the distance of the fourth of an inch from each other. After all the threads are passed, they are fastened together by a knot at each end; they are then to be brought together and twisted, which puckers the intestine, and brings the wounded surfaces into close contact. The gut is now to be returned, the ligature brought out at the external wound, and fastened to the bandage. When the wound in the intestine is thought to be healed, the ligature is to be untwisted, the knots at each end cut away, and the threads withdrawn in succession.

The suture, in whatever manner it is practised, must be productive of violent inflammation; it appears to me, therefore, preferable to secure each end of the wounded intestine, by means of a single stitch, to the external wound, and entrust the rest to nature. When the wounded intestine remains opposite to the external wound, no effusion into the cavity of the abdomen ever takes place; the single stitch retains it in this situation; and in a short time the peritoneal inflammation, which immediately commences in the vicinity of the wound, so fixes it, that it cannot alter its position. The alimentary contents are for a time discharged at the wound; but as nature has always a tendency to repair the breach, in nine cases out of ten, the opening will close up, and the continuity of the canal will be restored. I am convinced that this will always be the case, unless where the two divided ends of the intestine meet each other at an angle so acute that the fæces cannot pass from the upper into the lower end of the gut; but when this occurs, a cure of the artificial anus may still be effected by changing the angle by means of tents, or large tubes of elastic gum, and by compression, agreeably to the practice of Desault. Even when the ends of the intestine lie parallel to each other, the continuity of the canal may be restored, by making an opening betwixt the two parallel and adhering portions of intestine by means of ulceration, as has been successfully practised by Dupuytren at Hotel Dieu, and of which we shall take particular notice when we come to treat of artificial anus.*

After the cure of all abdominal wounds, the patient is particularly liable to hernia; he should therefore ever after wear a firm belt to obviate any protrusion.

WOUNDS OF THE EXTREMITIES.

It is chiefly in wounds of the extremities that the military surgeon displays his skill. When a man is shot or run through the body, we in general can do little more than entrust the cure to nature, except that we bleed profusely to keep down the actions of the system, and obviate inflammation; but in wounds of the extremities there may much be done, a variety of operations are performed, and many questions offer themselves for discussion.

The treatment of incised, punctured, and poisoned wounds of the extremities, does not differ essentially from the treatment of wounds of the same description, when situated on the head or trunk; and the doctrine and treatment of lacerated and contused wounds are embraced by the consideration of those inflicted by gunshot. In the few observations which I have now to offer on wounds of the extremities, I shall, therefore, confine myself chiefly to gunshot-wounds.

---

* For some valuable observations on Injuries of the Intestinal Canal, see "An Inquiry into the Process of Nature, in repairing Injuries of the Intestines," &c. by Benjamin Travers.

A leading subject of discussion has been the question of primary or secondary amputation in dangerous gunshot wounds of the extremities. I shall not retrace the arguments which have been adduced in favour of primary or secondary amputation. I consider the question as long since settled amongst the military and naval surgeons of this country. We are warranted by experience in asserting, that when the operation is immediately performed, the proportion of deaths will be very few. After a dangerous wound, wherever amputation is judged necessary, it should be performed as soon as the patient has recovered from the first shock. This doctrine seems to me to be as consonant to the true principles of surgery, as that we should attempt immediate reunion after every surgical operation; or that we should not amputate in gangrene from preternaturally increased action, till the gangrene has stopt, and the line of separation is marked betwixt the dead and the living parts.* Instead, therefore, of discussing what I conceive to be a settled point, we shall rather consider the nature of the wounds which require amputation; and this naturally leads us to say a few words on wounded joints, shattered bones, and wounded arteries.

---

* See an excellent work on Gunshot-Wounds of the Extremities, by Mr Guthrie, in which this question of immediate or delayed amputation is amply and ably discussed.

Wounded Joints.—Gunshot-wounds of the joints are frequently followed by high inflammation, fever, convulsions, and delirium, which in a few days generally prove fatal: but if the patient escapes these first dangers, a tedious and and profuse suppuration succeeds, with carious bones. It is difficult to support him under the suppuration; and although he may have run the greatest risks to save his limb, we are frequently in the end compelled to amputate, to prevent him from sinking under the discharge, or dying of hectic; still there are many cases on record where patients have recovered after being shot through the joints. Musket-balls have passed through the head of the humerus, and the patients have recovered without undergoing amputation.

I conceive that, when a joint is shattered by a cannon-ball, or by the bursting of a bomb, we ought immediately to amputate, as, independently of the fracture, the soft parts will be so contused that we can expect nothing but gangrene; I should also amputate when a joint was much shattered by a musket-ball, and more especially when complicated with another wound; but when a musket or pistol ball passes merely through a joint, and when there is no extensive fracture, we may attempt to save the limb. I may also remark, that we frequently amputate in the field or on shipboard, when we do not amputate in the same kind of wound in a duel, because in the former case, the patient must be moved from place to place during the cure, and generally has bad accommodation, whereas after a duel, he is laid quietly in bed, with every comfort and attendance. When we attempt to save the limb after a gunshot-wound of a joint, we must enjoin the most absolute rest, employ profuse bleedings in the first days after the injury, and repeat them according to the age and strength of the patient, enveloping the joint at the same time in warm poultices to promote the separation of the sloughs. When the suppuration is established, it is apt to become profuse and continue long from the fragments of bone or pieces of the cloaths which are frequently lodged, but which are ultimately discharged through the different sinuses. In this stage we must change our treatment: we support the patient by a nourishing diet, administer bark and wine, repress night sweats and the profuse discharge by the sulphuric acid, and allay irritation, and procure rest by means of opium. We must recollect that gunshot-wounds of the joints are long in healing; and in the most favourable circumstances, the cure is frequently attended by an anchylosis.

Shattered Bones.—When a limb is struck by a large ball or bomb, and the bone fractured, with much contusion and ecchymosis, we ought unquestionably to amputate, because the parts are so deadened that they will fall into immediate gangrene. We also amputate when the hand or foot is much shattered, and torn by a large shot, by grape, or by the bursting of a shell, and more especially if the limb is shattered or torn off by a cannon-ball, taking care to remove it at some distance above the contused parts where the vitality is perfect; in short, when a limb is much shattered, it is always better to amputate it than attempt to preserve it; for besides the immediate dangers which the patient runs, the limb is not only in general useless, but it requires years to accomplish the cure, and his health is frequently ruined. But if a bone is fractured, and even shattered by a musket-ball, more especially near its middle, we should endeavour to preserve the limb. We treat it as a compound fracture of the worst kind. We lay the limb upon a firm splint, make an incision down to the bone, and pick out the loose fragments, pieces of the cloaths, a bullet, or any foreign body which may be sticking in the wound. All the loose and detached pieces of bone should be removed, but those which are attached should not be forcibly pulled away, as there is a possibility of their being taken into the callus, although this is not so likely to happen as when the bone is fractured by a fall; because when it is shattered by a ball moving with great velocity, the contusion is so great that it destroys its vitality. This decided step of cutting down to the bone I conceive to be good practice; where this is done, the patient in general soon recovers; where it is not adopted, sinuses are very apt to form; and instead of the bone uniting at once by callus, part of the original bone dies, and necrosis succeeds.

Wounded Arteries.—We formerly remarked, that the characteristic of gunshot-wounds was not to bleed in the first instance, even when the principal artery of the limb was wounded. The surgeon should, therefore, reflect on the course of the ball; and if he has reason to conclude that a large artery is wounded, he should immediately put a tourniquet round the limb, till such time as he is able to dilate the wound, and tie the vessel, as it would be a great disgrace to allow a patient to bleed to death after the surgeon has once got him under his care. I mention this, because the circumstance has actually happened. A captain of a ship of seventy-four guns in the British navy, who fought his vessel in the most gallant stile, when opposed to a French ship of superior force, and which struck her colours after a well fought action, received towards the latter part of the action a musket-ball in his thigh. The ball passed through the femoral artery, but there was no immediate bleeding. The captain was carried to the cockpit; and although the situation of the wound and course of the ball proclaimed that the femoral artery was wounded, nothing efficient was done, and this meritorious officer was allowed to expire of hemorrhage, a quarter of an hour after he had been in the surgeon's hands. The artery is sometimes contused by the shot; there is no immediate bleeding; but when the slough separates on the eighth or tenth day, a profuse hemorrhage succeeds; sometimes the wounds heal up, and no bleeding takes place till they are completely cicatrized, when an aneurism begins to form slowly, as in the case of Fourcroy the gardner, related by Mr Manoury in the 2d volume of Desault's Journal. The femoral aneurism was operated upon by Desault with success; and when the sac was cleared out, " an opening of an oval form was discovered in the anterior part of the artery, about four finger's breadth above the part where it pierces the triceps muscle; this oval opening was about three lines in length, and two in width." The brachial artery has been wounded by small shot, without the occurrence of hemorrhage, during the fifteen days the patient lived. The case is detailed in the Philosophical Transactions, and is both curious and instructive.*

When much of the soft parts of a limb, including the principal bloodvessels, is carried away, we amputate it, as it would otherwise fall into gangrene. When, with a wound of the principal artery, a fracture is conjoined, and more especially when there is much contusion of the soft parts, we ought unquestionably to amputate, as it will be almost impossible to save the limb; but where the artery is only wounded by a musket-ball, slug, or splinter, we should attempt to preserve it. When the artery bleeds immediately after the wound, as it generally does when wounded by a splinter, we put on a tourniquet, enlarge the wound, search for the artery, and tie it above and below the wounded point as in the operation for aneurism; but when a slug or musket-ball passes through a limb, and we are led to imagine, from the direction of the ball or want of pulsation in the lower part of the limb, that the artery is wounded; we place a tourniquet loosely round it, and leave the patient in the charge of a pupil or assistant, with directions to screw the tourniquet when the secondary hemorrhage takes place; we then cut up the wound, and tie the artery. In bleedings from the inferior order of arteries, I have frequently thrust into the wound a piece of sponge, and thus stopped the hemorrhage, without being obliged to cut up the wound; in this case, we should always attach to the sponge a firm ligature, by which we afterwards withdraw it.

---

* See Philosophical Transactions, Vol. LX.

In gunshot-wounds of the extremities, it seems advisable to amputate in the following circumstances, although there can be no absolute rule, and much must be left to the judgment of the surgeon.

1st, Where a joint is shattered by a cannon-ball, or by the bursting of a bomb, because, independently of the fracture, the soft parts, will be so contused that they can hardly escape gangrene.

2dly, Where a joint is much shattered by a musket ball, and more especially when complicated with another wound.

3dly, When a limb is struck by a large ball or bomb, and the bone fractured, especially when there is much ecchymosis or contusion.

4thly, When the hand or foot is much shattered or torn by a large shot, by grape, or by the bursting of a shell.

5thly, When the limb is shattered, or torn off by a cannon ball.

6thly, When a fracture is conjoined with a wound of the principal artery, more especially where there is much contusion of the soft parts.

These are the principal gunshot injuries for which we amputate, but others may occur where the operation may be enforced by particular circumstances, which must be left to the discretion of the surgeon.

When both limbs are so much injured as to require amputation, the operation may be performed on both at the same time. I have known several cases where this has been done with success.

If gangrene seize a limb after a gunshot wound, it has been a question if we should venture to amputate before the gangrene stops.—Sharp, Pott, and other practical surgeons, have positively forbid the amputation of a limb when attacked with gangrene, until such time as the gangrene stops, and a line of separation is marked betwixt the dead and living parts. This doctrine has been assumed as a sort of aphorism by the profession, and has arisen from not reflecting that there are two species of the disease; one arising from an excess of vascular action, and the other from a defect of action, or from a want of circulation. If we amputate in gangrene arising from increased vascular action, or in that species of the disease following inflammation, more especially when arising from a constitutional cause, the gangrene will appear on the face of the stump, and the patient will die. Again, in that species of the disease arising from want of circulation, we may often amputate not only with safety but with manifest advantage, such as in the gangrene which frequently follows gunshot-wounds and contusions. In fact, in such cases the amputation prevents the gangrene from spreading, and guards the system from being infected by absorption.

Dr Aitken * enjoined amputation in these circumstances. He remarks, that " it may be made probable that this alarming disease (viz. mortification,) proceeds from two opposite states of the animal system, or parts affected ; the one consisting in a defect, the other in an excess of the natural and healthful vigour. Gangrene, produced by internal, and frequently unknown occasional causes, is likely to be connected with the first state : that consequent to the action of external, obvious, occasional causes, will generally flow from the second one."

He proceeds to observe, that " gangrene acceding from a local violence seldom proceeds much above the injured part : when consequent to the operation of an internal occasional cause, the space it may occupy must be exceedingly uncertain, at least the surgeon has no data from which he may infer at what point it is likely to stop. This remark, (says he,) applies usefully when amputation is suggested, and its expediency is to be determined."

Dr Aitken was in the habit of recommending amputation in gangrene proceeding from a local cause, although not always with succes.

---

* See *Systematic Elements of the Theory and Practice of Surgery*, by JOHN AITKEN.

Larrey has revived the question, and adopts the sentiments of Dr Aitken. He cites many cases, which prove that amputation may be safely performed in gangrene following injuries from gunshot. He says nothing about the state of the arterial action in the limb ; but, I may observe, that the less the inflammation, and the more nearly it approaches to gangrene from want of circulation, the more certain our success. *

Gangrene, arising from a compound dislocation or a compound fracture, is unfavourable to amputation, because it follows inflammation, and results from increased vascular action ; whereas, when gangrene succeeds to a gunshot-wound or a violent contusion, it most frequently arises from a disorganization of structure, and not from inflammation. This seems to be a good practical distinction. It, therefore, appears, that there are many cases of gangrene following a local injury, and arising from a defect of vascular action or want of circulation, where we may amputate not only with safety but with manifest advantage, because we not only prevent the habit from being tainted by absorption, and keep the gangrene from spreading, but make a better stump.

---

* See *Observations on Traumatic Gangrene*, in the Third Volume of Memoires De Chirurgie Militaire, by D. J. LARREY.

The doctrines which have been already laid down respecting gunshot-wounds in general, are all applicable to those of the extremities; but as wounds of this kind most frequently occur, and as they are the ones in which the surgeon can do most by manual operation, it seems requisite to subjoin a few rules of practice.

1st, When a musket-ball passes directly through the fleshy parts of the arm, thigh, or leg, without fracturing a bone or wounding an artery, we put a small bit of lint on each orifice, apply a large warm poultice, renew it thrice a-day, and continue it till the slough separates. We then lay aside the poultice, and still dress the wounds superficially till they heal.

2dly, If the tract of the wound inflames, and the discharge becomes thin and profuse, as it most likely arises from a piece of the cloaths or other foreign body; we wash out the wound by injections, or try to entangle the extraneous substance with the probe; and as soon as it is removed, the inflammation ceases, the discharge assumes a good quality and consistence, and the wound heals rapidly.

3dly, If the ball does not pass completely through the limb, but can be felt under the skin, we cut upon it and extract it, making what has been called a counter opening; betwixt the lips of this incision, we insert a bit of lint till the suppuration is established, and this prevents adhesion.

4thly, If the bullet has not passed nearly through the limb, but lies imbedded in the muscles, we should attempt to remove it by the bullet forceps, taking care not to catch hold of any artery or nerve; but if the ball is firmly fixed, or cannot be discovered, we should employ no force to extract it, nor be tedious in searching for it, as it will become loose when the suppuration is established, and will then fall towards the orifice of the wound, or be easily removed with the probe or dressing forceps, or may remain without producing any inconvenience.

5thly, If we ascertain that the body lodged is a ragged piece of iron or a nail, it will be advisable to enlarge the wound and extract it; as when allowed to remain, it always produces high inflammation, and swelling; great pain, and violent symptomatic fever, with a profuse discharge.

6thly, Wherever the pus forms sinuses, or works its way down amongst the cellular substance, or betwixt the muscles, we should always make one or more counter-openings to let out the matter, dress the sores superficially, and apply a firm roller with expulsive compresses. *

7thly, When a musket-ball has passed through a joint, and we attempt to save the limb, we enjoin the most absolute rest, employ profuse bleedings

---

* For some valuable practical remarks on the application of the roller in sinuous abscess, see a paper by Dr Henry Dewar, in the Seventh Volume of the Medico-Chirurgical Transactions.

in the first days after the injury, and repeat them according to the age and strength of the patient, while we envelope the joint in warm poultices to promote the suppuration. When the suppuration is established, should it become profuse, produce hectic fever, and reduce the strength, we support the patient by a nourishing diet, administer bark and wine, give sulphuric acid to repress the night-sweats and the profuse discharge, and opium to procure rest and allay irritation. In this stage, it is sometimes necessary to amputate.

8thly, When a bone is fractured by a musket-ball, it is generally much shattered; we must therefore treat it as a dangerous compound fracture: we lay the limb out upon a firm splint, dilate the wound, or, in other words, make an incision down to the bone, and pick away the loose fragments, pieces of the cloaths, the bullet, or any foreign body which may be left in the wound; all the loose and detached pieces of bone should be removed, but those which are attached should not be forcibly pulled away, as there is a possibility of their being taken into the callus.

9thly, If a hemorrhagy takes place from a gun-shot wound, and the surgeon sees from the course of the ball, or want of pulsation in the lower part of the limb, that the artery is wounded, he should immediately apply a tourniquet, enlarge the wound, and tie the artery. If it belongs to the smaller order of arteries, he may trust to compression by the sponge.

10thly, If there is no bleeding, but if there is still reason to believe that a large artery is wounded or contused, the surgeon should apply the tourniquet loosely, and leave the patient in the charge of an assistant. The bleeding will come on when the slough separates; the tourniquet is then to be screwed, the wound cut up, and the artery tied.

These appear to be the most material rules to regulate our practice in gunshot-wounds of the extremities; although, no doubt, cases will occasionally present themselves, which must be managed according to the judgment of the surgeon.

CHAPTER VI.

BANDAGES.

The application of bandages forms a leading part of the ordinary and daily occupations of the surgeon. In many surgical diseases, the most important advantages are to be derived from their use. After every surgical operation, in every wound, whether inflicted by accident or design; in the obliteration of cavities; in the discussion of indolent tumors; in the management of fractures; in many of the diseases of the joints; in the suppression of hemorrhagy from the smaller order of vessels, and in the treatment of ulcers, it is to the bandage that we chiefly trust. The young surgeon should devote much of his time in applying the various bandages required after operation or accident, or in diseases, as it is only by practice that he can attain dexterity and neatness. This department is so much neglected, that I have seen many surgeons who practised scientifically, and who operated successfully, but who still could not apply a bandage with the precision and neatness requisite to effect the purpose for which it was required.

Bandages are made of linen, of cotton, flannel, or serge. Every bandage should be somewhat elastic, so as to yield in some degree to the swelling of the limb. Cotton or flannel are, therefore, preferable to linen. In warm weather or in warm climates we use cotton; and in cold weather or in cold climates we prefer flannel. The military and naval surgeon will find old ensigns and other flags made of the stuff called Buntin, admirably adapted for bandages, possessing both firmness and elasticity. When the bandage is made of cotton or linen, it should always be washed before it is used, otherwise the pins required to fasten it cannot be passed but with the utmost difficulty.

The ancients employed a useless multiplicity of bandages; the moderns have reduced them to greater simplicity; still it would appear that there is room for a farther reduction of the catalogue. In the course of this work, I shall point out the bandages that may be best adapted to particular accidents or operations, and at present describe only such as I conceive to be requisite for the common occurrences of practice. These I shall enumerate in the order of their comparative simplicity.

1st, The Simple Roller.
2d, The Double Headed Roller.
3d, The Spica Bandage.
4th, The Uniting Bandage.

5th, The Four-Tailed Bandage, or Four-Headed Roller.
6th, The Napkin and Scapulary.
7th, The T. Bandage.
8th, The Couvre Chef or Kerchief.
9th, The Suspensory Bandage.

1st, The Simple Roller.—The simple roller is the bandage most generally used. It consists of a long strip of cotton, flannel, &c., generally from three to four inches in breadth, and four, five, six, or seven yards in length, more or less according to the purposes to which it is to be applied. We have recourse to the simple roller on many occasions, but chiefly in discussing or resisting the growth of tumors; in obliterating a dropsical bursa, or curing a diseased joint; in preventing the matter of abscesses or gunshot-wounds from working along a limb, and undermining the cellular substance or separating the muscles; in the management of anasarcous or varicose limbs, and in the treatment of the callous or indolent ulcer: in all which cases, the simple roller acts upon the principle of support or compression.

The simple roller has also been used in the treatment of fractures of the extremities; but there is only one kind of fracture where its use is admissible, viz. fracture of the humerus, because in no other can it be applied without moving and discomposing the limb.

When we have recourse to the roller rof support or compression, as in bandaging an anasarcous or varicose limb, in an indolent ulcer, or a dropsical joint, we apply the bandage to the whole limb, so as to afford a general and uniform support. For this purpose, we roll from the points of the fingers or toes up to the shoulder or groin. If we be not careful to attend to this, the bandage, instead of doing good, will do infinite harm. It will operate as a ligature, strangle and swell the lower part of the limb, and will be in danger of inducing gangrene. Although we always roll the whole extent of the limb, so as to support it with an equable pressure, and keep one point from yielding to the compression of another, still in some cases, as in the suppression of hemorrhage; in the obliteration of tumors; in the discussion of dropsy of the joints, we increase the pressure as we pass over the injured or diseased point; this we effect by reversing or taking a twist with the roller, and we add to the compression by the application of one or more compresses under the roller.

In the application of the roller, the bandage should be so laid on the limb that the roll may gradually glide off of its own accord, as the surgeon makes the different turns. In applying it to the upper extremity, he begins at the wrist, and in the lower extremity at the ancle, carrying the turn first to the points of the fingers or toes, and then returning upon the limb. The bandage should be rolled outwards spirally, laying one turn over the other one-third of its breadth; and wherever it becomes slack from the varying circumference of the limb, or wherever the surgeon wishes to increase the pressure, he makes a reverse or twist with the roller, fastening it with a pin at that point, taking care to make all the reverses upon the outer part of the limb. Fig. 1. and 2. represent the application of the roller to the lower extremity; fig. 1. shews the manner in which we commence its application at the ancle, and fig. 2. the manner in which it is rolled along the limb.

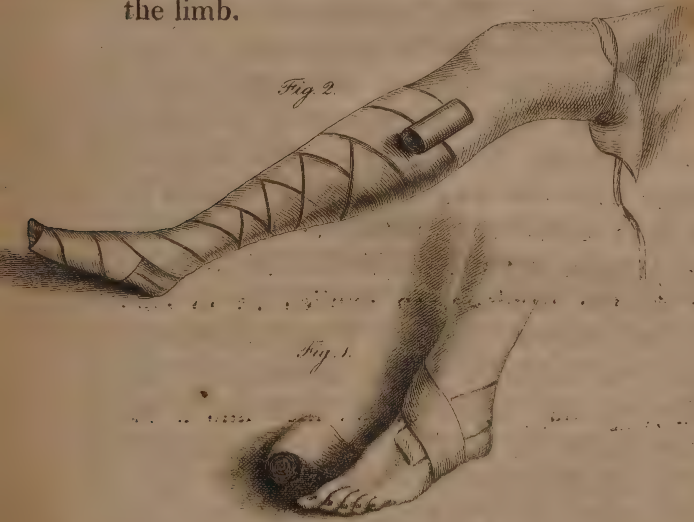


Fig. 2.

Fig. 1.

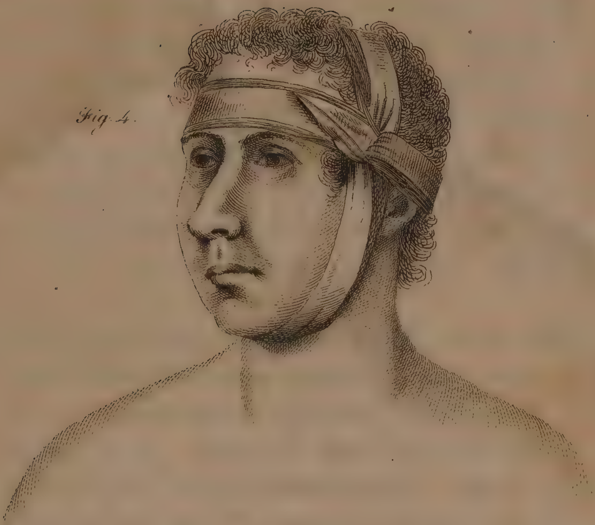
Engd by W. & D. Lizars Edinr

2d, THE DOUBLE HEADED ROLLER.—The double headed roller is just the simple roller, rolled up at both ends; and instead of applying it from one end, we begin its application, by laying on the centre of the bandage. According to the different parts to which this bandage is applied, and the varieties of forms we give it, by carrying the heads in different directions, it has received various names, such as the spica bandage, when applied to the shoulder or groin, and the uniting bandage, when split in the centre, one of the heads carried through the opening, and then used to support the lips of a wound, and retain them in contact. The double-headed roller is particularly well adapted for compressing the temporal artery, or for wounds about the angle of the jaw; and here we are enabled to increase the compression, by knotting or twisting the bandage over the wounded point; hence it has then been called the knotted or twisted bandage. Figure 3.,* the double headed roller; figure 4., the bandage, so applied as to compress the temporal artery. When used for this purpose, we employ a double headed roller, five or six yards long, and about an inch and a half or two inches in breadth. We commence by placing the compress over the wounded artery; we lay the centre of the bandage on the sound

---

* See next Page.

Fig. 4.



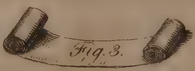


Fig. 3.

Eng.d by W. & D. Lizars Edin.r

temple, and carry one roll round the forehead, while we bring the other round the occiput, till both meet at the wounded point. Here we cross the bandage, carrying one roll over the crown of the head, and the other down under the chin, and up the opposite side, till they both meet on the sound temple. We cross them, carrying them, as at first, circularly round the head, till we arrive at the wounded point, where we again cross them. We proceed in this manner, alternately carrying the roller horizontally and vertically round the head till it is expended, and always knotting or twisting the bandage over the point we mean to compress. This form of the roller is particularly useful in wounds and operations about the angle of the jaw, is then applied in the manner we have now represented as for the temple, only in this case, the bandage must be twisted or crossed upon the point we mean to compress over the sponges and compresses behind the jaw instead of the temple.

3d, THE SPICA BANDAGE—is just a double headed roller, applied in a particular manner to the shoulder or groin; and from its resemblance to an ear of corn, has derived its name. It is useful in all accidents and operations about the root of the neck and top of the shoulder, as in fractures of the clavicle and scapula near the top of the shoulder, after the extirpation of tumors, and in hemorrhagies and wounds about the upper part of the chest. In luxations of the thigh, fractures of the pelvis, wounds and aneurisms of the groin and hip, and after the operation for hernia at the inguinal ring and crural arch. This bandage should be five or six yards in length, and about three inches in breadth. When applied to the shoulder, we commence by laying the centre of the roller under the sound axilla, carrying one head obliquely across the breast, and the other in like manner across the back, till we arrive at the top of the wounded shoulder, when we cross the heads. We then carry them under the axilla of the same side, cross them again, bring them up once more over the same shoulder; cross them again, and carry one head along the breast, and the other along the back to the sound side; we then return by the breast and back to the affected shoulder; nere we cross the bandage as at first; then carry the two heads under the axilla, and, returning to the shoulder, proceed in this manner till the bandage is expended.

When we use the spica bandage in wounds of the groin, we begin by passing the roller round the body from the sound side; we then cross the heads, carry them over the top of the thigh to the inside; cross them here; bring them up to the outer part of the thigh; cross them once more; then carry the bandage round the body to the sound side, and continue repeating the same steps till it is expended. Fig. 5. represents the application of the spica to the shoulder, and fig. 6. to the groin.*

---

* See the Plate, next page.

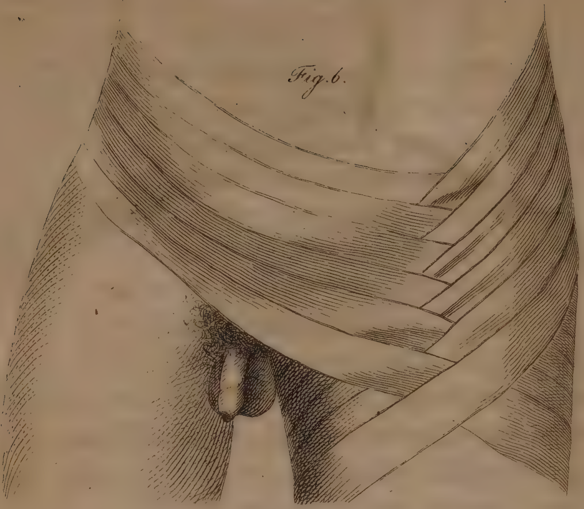


Fig. 6.

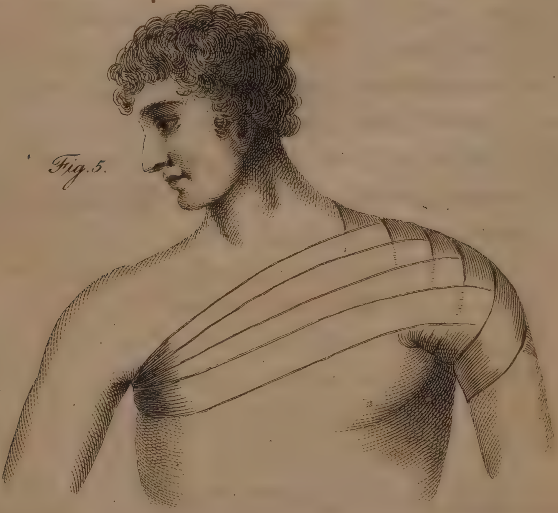


Fig. 5.

4th, **The Uniting Bandage.**—The uniting bandage is nothing but a double headed roller, with a slit of two or three inches in length in its middle. Its use is to keep the opposite sides of an incised wound in contact; and when applied, the slit is placed over the wound, and one of the heads of the roller passed through it. Both heads are then pulled tight, by which not only the lips of the wound, but the whole cut surfaces are approximated, retained, and supported in that situation. This bandage has been applied to wounds of the forehead, but is chiefly useful in those of the limbs. It is delineated in fig. 7.; its application to a wound of the thigh in fig. 8.

Fig. 8.

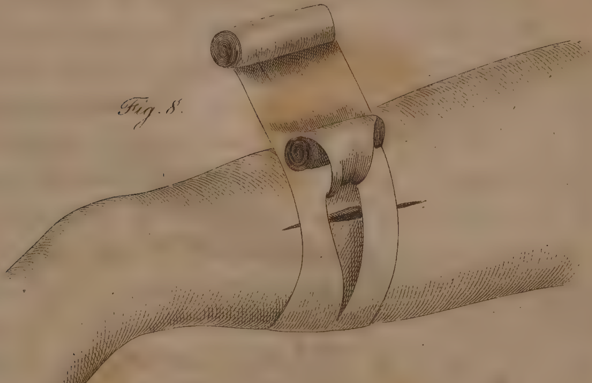
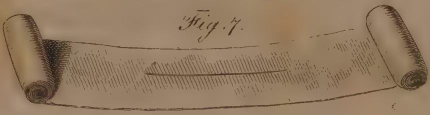


Fig. 7.



Engd by W. & D. Lizars Edinr

5th, THE FOUR-TAILED BANDAGE, or FOUR HEADED ROLLER,—is the bandage we employ in wounds or after operations on the forehead and face, and in particular after the operation for hare-lip, extirpation of tumors or of the cancerous lip, and fractures of the lower jaw. It is formed of a band of linen or cotton, two yards in length and four inches in breadth, split at both ends down to within three inches of the centre, leaving the middle portion of the bandage six inches in length undivided, which receives the lower jaw. In the application of this bandage, after extirpation of the cancerous lip or fracture of the lower jaw, the central undivided portion is applied to the chin; the two outer rolls are then carried upwards and backwards to the occiput where they are crossed; they are now brought forwards, so as to encircle the head, and then fastened on the forehead. The two inner rolls, situated under the jaw, are carried upwards by the sides of the head, crossed, and knotted on the crown, by passing one end of the roller through the other; they are then carried down under the chin, where they are fastened. The four headed roller is delineated in fig. 9., and its application to the lower jaw in fig. 10.*

---

* See the Plate, next page.

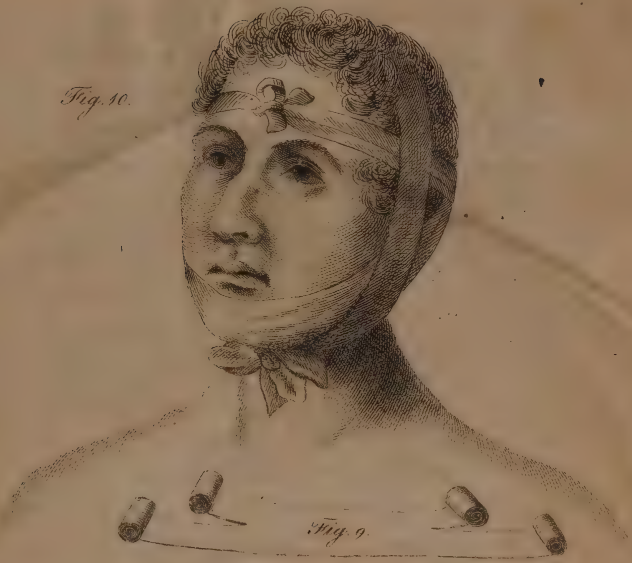


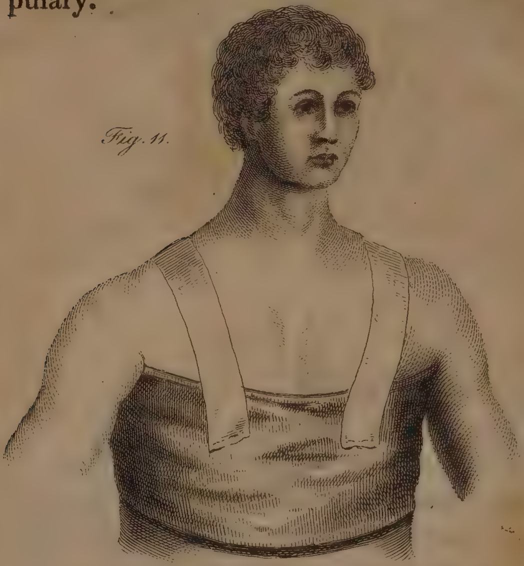
Fig. 10.

Fig. 9.

Engd by W & D Lizars Edinr

6th, The Napkin and Scapulary—form a compound bandage, used after fractures of the sternum and ribs, or wounds and operations on the chest. The napkin surrounds the chest, and the scapulary supports it, and prevents it slipping downwards. It consists of a broad piece of linen or cotton, a yard and a half in length, or what is preferable, a table napkin or shawl so folded as to make a band six or eight inches in breadth. This is applied round the chest with a greater or less degree of tightness, according to the nature of the case. After this part of the bandage is fastened with pins, we take two slips of linen, each about three quarters of a yard in length, and two inches in breadth: we pin them to the napkin upon the breast, and carry the tails over the shoulders, cross them behind, and again pin them to the posterior part of the napkin in the form of braces. Fig. 11. illustrates the application of the napkin and scapulary.

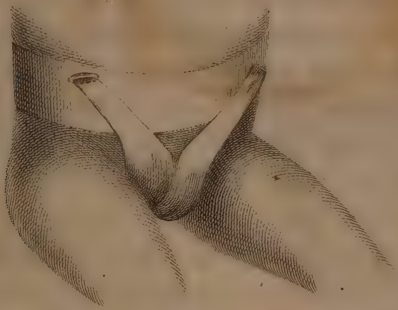
Fig. 11.



Engd. by W.&D. Lizars Edinr.

7th, The T Bandage—so called from its resemblance to the letter T, is the bandage we use in wounds, and after operations on the lower part of the trunk, the anus, perinæum, scrotum, and groins. It consists of a broad band or belt which passes round the lower part of the body. To the centre of this band there is attached a long tail, which passes betwixt the thighs over the perinæum, where the tail is split into two portions. One is carried up over one groin, while the other is carried over the opposite groin, and both are then fastened to the circular part, which passes round the body. When this bandage is used for retaining dressings about the anus or perinæum, the circular belt is made about three inches in breadth, but when it is intended for wounds about the lower part of the trunk, the portion which passes round the body should be eight or ten inches in breadth; and in that case there should be attached to it the scapulary portion of the napkin, to prevent it slipping down. I may remark, that two large silk or cotton handkerchiefs fastened together in the form of this bandage, answer all its purposes. The T bandage is delineated in fig. 12. and its application is represented in fig. 13.

Fig. 13.



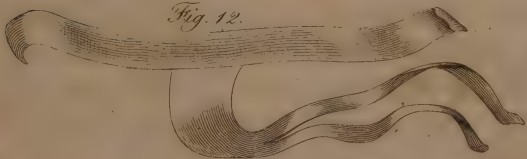


Fig. 12.

Eng.d by W. & D. Lizars Edin.r

8th, The COUVRE CHEF, or KERCHIEF—is the proper bandage for the head. We employ it after the operation of trepan, and in wounds of the scalp. It is either applied in a triangular or square form; the former denominated the Simple Kerchief, and the latter the Great Kerchief, or Grand-Couvre-Chef. When applied in a triangular form, which is the simplest method of using the bandage, we take a large square handkerchief, and fold it of a triangular shape. We place the centre of the longest side of the triangle upon the forehead, while the expanded part of the bandage covers the whole head. We carry the two ends or corners round to the occiput, cross them at that part over the third or remaining corner, and then bring them forward to the forehead, where we either tie them, or fasten them with pins.

This is the bandage which we most commonly employ after the operation of trepan, or in injuries of the scalp; but if the wound be situated about the lower parts of the temple or occiput, we may have recourse to the great kerchief, which is the bandage most generally employed by the French surgeons in dressing injuries of the head.

To form this bandage we take a large handkerchief, table napkin, or square piece of linen or cotton; we double it, laying it in such a manner that the border of one half may project three inches beyond the other. We place the centre of the bandage upon the crown of the head, with the broadest part undermost. The projecting borders in this situation hang over the forehead reaching to the eyes, with the four corners by the sides of the head; two over each shoulder. We now take the two upper corners, bring them close, and tie them under the chin. We turn back the lower projecting edge of the bandage, which hangs over the brow towards the crown of the head, and we carry the lower corners back to the occiput, where they are fastened. That part of the bandage which still hangs in folds over the shoulders, we gather up and fasten behind the ears. This is a neat bandage when properly applied, but, like the simple roller, requires considerable practice to apply it with dexterity. The simple kerchief is delineated in fig. 14, and the great kerchief in fig. 15. Fig. 16. represents the application of the simple, and fig. 17. that of the great kerchief.

Fig. 16.

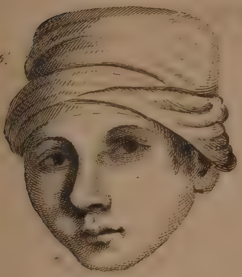


Fig. 17.

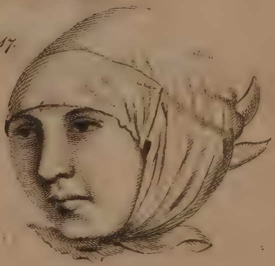


Fig. 14.

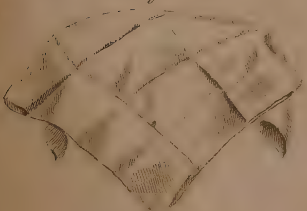
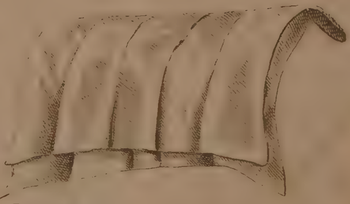


Fig. 15.



Engd by W. & D. Lizars Edinr

9th, The SUSPENSORY BANDAGE—is used in the diseases and operations of the testicle and spermatic chord, and for supporting those parts in adhering or irreducible hernia. It consists of a circular strap passed round the body, to which there is attached a small pouch or bag for receiving the testicles. It is needless to describe this bandage more minutely, as it may always be procured in the cutler's shops; only it is right to observe, that the bag, or that part of the bandage which receives the testicles, should not be made of cotton, but of silk or worsted net, which, from its elasticity, is better adapted to the state of the parts.

END OF VOLUME FIRST.